HAZARDOUS WASTE LANDFILLING—IMPACT ON SMALL BUSINESSES

HEARING

BEFORE THE

SUBCOMMITTEE ON ENERGY, ENVIRONMENT, AND SAFETY ISSUES AFFECTING SMALL BUSINESS

OF THE

COMMITTEE ON SMALL BUSINESS
HOUSE OF REPRESENTATIVES

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HAZARDOUS WASTE LANDFILLING—IMPACT ON SMALL BUSINESSES

FRIDAY, JUNE 3, 1983

House of Representatives,
Subcommittee on Energy, Environment and
Safety Issues Affecting Small Business,
Committee on Small Business,
West Covina, Calif.

The subcommittee met, pursuant to notice, at 8:40 a.m., in the Shadow Oaks Community Center, 2121 Shadow Oaks, West Covina, Calif., Hon. Ike Skelton (chairman of the subcommittee) presiding.

OPENING STATEMENT OF CHAIRMAN SKELTON

Mr. Skelton. Ladies and gentlemen, I appreciate your being with us today. My name is Ike Skelton. I am a Congressman from Missouri and the chairman of the Small Business Subcommittee on Energy, Environment and Safety Issues Affecting Small Business.

We are pleased to be here to hold this hearing in West Covina, Calif. We first want to thank you for your courtesy and the hospitality you have extended us and a special thanks to the very valued member of our subcommittee, Congressman Torres, who invited us to be with you today and to make inquiry at this hearing.

We are on a very tight schedule. I will have to apologize ahead of time that I must be back in Missouri late this evening, so at a given time I turn into a pumpkin and I have to leave. I hope that we will be able to get all of our 22 witnesses in within the allotted time. If not, the gentleman from California, Congressman Torres, has agreed to chair the balance of the meeting, but we will do our best to hear as many as we possibly can while I am here.

I want to express a special thanks to Congressman Torres, who, since the beginning of our association in Congress and as a member of this subcommittee, has been a very valuable member of this subcommittee, has worked on issues that we have held hearings on and has assisted me in one that is very near and dear to me in the agribusiness area of small business.

We are here today to investigate a growing problem for the industrialized world. It is one that takes a great deal of expertise. I might say that Congressman Torres has been kind enough to be with us today. We invited other members of the subcommittee. The ranking Republican and his staff were unable to be with us, but they did acknowledge the fact that they did wish to be with us, but were unable to because of their schedule.

I also might point out that there are votes in the House of Representatives today that other members of the subcommittee did not wish to miss.

We have with us two other gentlemen, besides the two of us who are Members of Congress. The gentleman to my left is Russell Orban, who is the subcommittee counsel; he is our lawyer. The gentleman to my right is a member of our staff, who is detailed to us from the Library of Congress, the Congressional Research Service, Dr. Michael Simpson.

From time to time, these gentlemen, in addition to Mr. Torres and myself, may be asking questions of the witnesses.

We are here to investigate the problem of how to dispose of manufactured hazardous waste safely, efficiently and economically. Hazardous waste is a byproduct of many of business pursuits from the largest factory to the smallest gasoline station. Clearly, we can't bring our commerce in the country to a standstill, but neither can we afford to leave our waste problems unabated. The proportions of the hazardous waste situations are quite substantial. In your State of California, alone, over 5 million tons are produced annually. Each day the United States produces enough hazardous waste to fill the Los Angeles Coliseum five times.

Our past indifference to the problem of waste disposal is coming back to haunt us. The magnitude of our problem has only recently become all too clear. We can't afford to repeat the mistakes that created the Love Canal, Times Beach, Stringfellow or hundreds of other sites scattered throughout the country.

In response to the growing concern throughout our country, that long-term damage is being done to our environment, Congress created a Federal system of laws to address the situation. The majority of these issues are handled by laws such as the Clean Air Act, the Clean Water Act, and the Resource Conservation and Recovery Act. Now, these are before the Congress for reconsideration.

Our task is to review our progress in meeting our environmental goals to determine whether the laws we have are doing the job and make the policy corrections that are necessary to get us back on track.

This subcommittee is charged with investigatory authority over the activities of the EPA, that is, the Environmental Protection Agency, and all other environmental and safety-related Federal programs that have an effect on the Nation's small businesses. One area of concern that has been brought to our attention is the hazardous waste landfills. Congress and the media have focused attention on the health risks that may result from the dumping of toxic wastes.

What is often overlooked, and it is so closely related to the public awareness of health hazards, is the health of the economy of the businesses which share a community with a landfill. Businesses can live or die from mere inference of toxic danger. Customers can simply take their business elsewhere; new businesses tend to shun the area.

Problems related to landfills, such as spills or ambient fumes cause losses to sustaining businesses. Against this information we must balance the reality that without a landfill, as an inexpensive means of toxic waste disposal, many businesses in a much broader area will suffer severe financial difficulty. This is particularly true for small businesses that don't have the capability for onsite waste treatment.

Our purpose here in West Covina today is to examine one of the largest landfills in the United States and to establish for the record how it is run, whether the laws that are in place are effective and, finally, the risks and benefits that are associated with this method of waste disposal. The BKK, we believe, is symptomatic of landfill situations occurring throughout our country.

Finally, we hope that this hearing will shed some light on the future direction of Congress, the States and industry could be or should be taking to find long term solutions to hazardous waste disposal problems.

Again, we thank you for being with us. Before I call on our esteemed friend, I will ask the witnesses to be as brief, as concise as possible. When we must move from one witness or one panel to another, we hope we can do it with as great a dispatch as possible because we want to hear all the testimony that we can today.

Congressman Torres.

OPENING STATEMENT OF HON. ESTEBAN EDWARD TORRES, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. TORRES. Thank you, Mr. Chairman. I, too, echo your sentiments in thanking this group of citizens that is here before us today. Primarily, I want to thank you for chairing these hearings. I am particularly grateful that you agreed to come to West Covina today, even though the House of Representatives is in session and you and I both are missing some votes, but your doing so constitutes positive proof that you understand the value of the factfinding mission we are engaged in today.

Mr. Chairman, as you know, congressional committees hold hearings, receive testimony, and ask questions in order to establish a factual basis for the legislation which is subsequently considered. You and I were elected to Congress to represent our constituents in the legislative branch of our Government. Our primary task is legislative. We write legislation, introduce bills and vote in the House and we send our final product to the executive for his disposition.

The quality of the legislation we pass depends upon the information we receive. That is why the process of hearing testimony is so important to our work.

In your statement, Mr. Chairman, you alluded to the heightened awareness we all have about hazardous waste, toxic materials and their effect on our lives and our property. This awareness is in part due to the wide publicity such places as Love Canal and Times Beach have received. Volumes of testimony have been heard by numerous congressional panels on abandoned waste sites. The questions most frequently asked about these sites are: "How fast can they be cleaned up?" "What can the Government do to protect people from the harmful health effects of chemicals?"

Here in West Covina, we have an active site which receives hazardous waste from all over southern California. It is operating now, today. The subcommittee toured the landfill this morning. It may be operating for some time in the future.

Therefore, these hearings are unique. We are gathering facts not on an abandoned or closed site, but on an operating site. We want to know how an operating hazardous waste landfill impacts, as the chairman stated, on neighboring small businesses and residents; that is our mission.

We will be able to do our job if we learn the answers to four questions about the BKK landfill: What has gone in there? What happens when it gets there? What does it do while it is there? Does it stay there?

Unless we have the answers to these four pertinent questions, we will not be able to accomplish our mission.

Mr. Chairman, these hearings are being held contrary to some advice I received from constituents. I have been told that hearings on BKK would be like opening Pandora's box. Unnecessary evils would escape and really the community would be far the worse.

But that is not the whole story. If you recall Pandora's box, according to Greek legend, Pandora was sent by Zeus as the first woman on Earth. When she arrived, she was bearing a box containing all the evils which were ever to plague humankind. Though admonished to never open the box, her curiosity, of course, drove her to slip off the cover. Immediately, out flew its contents, its grievous spirits, pain, sickness, anger, envy, sorrow, despair, spite, revenge. Pandora replaced the top quickly, but it was too late, the entire contents had escaped, except one and she had closed the cover on it. The one spirit which remained in the bottom of the box was hope. Hope alone was retained in the box and to this day, mankind still has hope. Evil spirits may abound, but as long as we have hope, our lives will never be entirely wretched.

So, today, Mr. Chairman, as you and I participate in these hearings, we probably will be opening Pandora's box. Numerous evils may be let fly, but I also believe that if we work together; you and I, our community, our constituents, our business people, that when these hearings conclude, the people of West Covina will be left with at least one thing and that is hope.

Thank you very much.

Mr. **Skelton**. Thank you, Congressman Torres. I guess your association with this small town country lawyer has caused some of the show-me attitude to rub off on you. I appreciate your frank remarks and I look forward to the hearing today.

Before we call our first witness, we wish to ask the mayor, Kenneth Chappell, from West Covina for a short statement.

Mayor.

TESTIMONY OF KENNETH CHAPPELL, MAYOR, CITY OF WEST COVINA, CALIF.

Mr. **Chappell**. Honorable Members of Congress, I am Ken Chappell, mayor of the city of West Covina. It is my pleasure to welcome you today as you begin your study on the effects of the BKK class I sanitary landfill on small businesses in this area.

I hope what you learn here today will help you understand a few of the problems that communities such as ours across the Nation face as we all try to cope responsibly with the challenges of hazardous and toxic waste disposals.

I will be speaking to you this afternoon about the city's response to the situation as it exists in West Covina. Please be assured that I and my staff are here to assist you in any way we can as you gather information and data. I think I can speak for everyone here today thanking you for the time you are giving us and for your thoughtful consideration of these important issues.

We will be talking to you later this afternoon and good luck to you in your hearings this morning.

Mr. Skelton. Thank you very much.

Mr. Torres. Thank you very much.

Mr. Skelton. I wish to call as the first witness, from the U.S. Environmental Protection Agency, Harry Seraydarian, who is the Director of the Toxics and Waste Management Division, Region IX, from San Francisco, Calif.

Mr. Seraydarian, I would remind you and admonish you, as well as all the other witnesses, of our time constraint and with that in mind, I welcome you to our hearing.

TESTIMONY OF HARRY SERAYDARIAN, DIRECTOR, TOXICS AND WASTE MANAGEMENT DIVISION, REGION IX, U.S. ENVIRONMENTAL PROTECTION AGENCY, SAN FRANCISCO, CALIF.

Mr. Seraydarian. Good morning. Thank you, gentlemen.

I am pleased to be with you today and I will focus my remarks on the questions that were included in your letter of May 3.

The Federal Resource Conservation and Recovery Act regulates generators, transporters and those facilities that store, treat or dispose of hazardous waste. The BKK site in West Covina disposes of hazardous waste on land and is, therefore, subject to the requirements of RCRA. The California Department of Health Services, which will speak later, has been authorized by EPA to administer parts of the RCRA program instead of EPA.

Mr. Skelton. For the audience, you might tell them what RCRA is.

Mr. Seraydarian. OK. It is the Resource Conservation and Recovery Act. It was an outgrowth of the Solid Waste Disposal Act and now it focuses on hazardous waste management. The Department of Health Services enforces interim facility standards which apply until permits can be issued to each facility. DOHS also enforces the manifest system which follows a waste from generation to disposal and helps insure that it is properly disposed of.

EPA has not yet authorized the State of California to issue facility land disposal permits. When California develops regulations at least as stringent as those of EPA, this part of the program will also be delegated. At this time, BKK must comply with the interim standards and manifest requirements administered by the Department of Health Services and also must prepare a permit application at the direction of EPA. We requested that application at the end of January of this year and it is due in August 1983. The program may be totally delegated to California before the permit can be issued. If that is the case, the department will issue and enforce the permit.

We are assured that the State conducts periodic inspections for compliance with the currently effective standards. These standards include ground water monitoring and also insures that there are no adverse effects on ground water.

Another key element is the requirement that money be set aside to fund proper closure and postclosure care of the facility. To date, the State has not reported any violations at the BKK West Covina facility to EPA. We have asked the department and the State Water Resource Control Board to carefully review compliance with the ground water monitoring requirements at all the major sites in California and that includes BKK.

In addition to the RCRA requirements, the State enforces a number of other requirements imposed by the State independent of these Federal requirements. The State has designated BKK as a class I disposal site under its own classification system, meaning that BKK may accept almost all types of hazardous wastes.

The State agencies including the department, the State Water Resource Control Board and the State Solid Waste Management Board, as well as a number of local agencies, enforce standards associated with this designation. These agencies, I am sure, will be discussing compliance with the State class I requirements.

EPA's involvement with BKK to date has been limited. We have not conducted any studies on the effects of BKK's landfill operation on small businesses in West Covina. Our files don't contain any such studies. The RCRA regulations were not yet effective when BKK began to receive hazardous waste at its landfill.

Mr. **Skelton**. When was that passed? Do you remember?

Mr. **Seraydarian**. Yeah, 1976. The regulations were first passed in 1980.

Mr. **Skelton**. Thank you.

Mr. **Seraydarian**. It is, therefore, regulated as an existing facility, not a new facility. When BKK commenced its operation, there were no Federal requirements for hydrogeologic or health studies. Thus, no such studies were conducted or commissioned by EPA. However, we are aware that such studies have been conducted by the State and BKK.

As I mentioned, in January of this year EPA required BKK to commence detailed work on its application for a RCRA permit to dispose of hazardous waste on land. This permit program is being administered by EPA until the State can be authorized to run it.

BKK must produce an indepth ground water monitoring plan and organize the data obtained to date. Other aspects of the application include a waste analysis plan, a contingency plan for any accidents and a control of runoff from rain and the planning for future events.

EPA's regulations prohibit the land disposal of containerized liquids and restrict disposal of reactive and ignitable wastes. Should ground water contamination occur, the permit would require that corrective action be taken to clean up the problem.

The application is due to be submitted in August of this year and we have corresponded with BKK to date on that application.

That concludes my formal remarks. I would be happy to answer any questions and I do plan to stay the rest of the day, so if you would like to call on me again, I will be available.

Mr. **Skelton**. Thank you. Mr. Torres.

Mr. **Torres**. If a complete record, including a detailed description of all hazardous wastes received at the BKK landfill since 1968 does not exist, will EPA assist the subcommittee in studying the manifests and the contents of the BKK landfill and assist in the comprehensive analysis therein?

Mr. **Seraydarian**. We have authority under RCRA to request any historic information. It wouldn't be part of our normal request for the permit application, but if it is necessary, we can request it.

Mr. **Torres**. Prior to the end of last year, as I recall, Mrs. Rita LaVelle made a visit to the BKK landfill. Can you tell me the reasons for that visit?

Mr. **Seraydarian**. To be honest, I didn't even know about the visit.

Mr. **Torres**. Thank you.

Mr. **Skelton**. Let me see if I understand. You have asked BKK for an application for a permit. Is that correct?

Mr. **Seraydarian**. Yes.

Mr. **Skelton**. Where does that stand at the present time?

Mr. **Seraydarian**. According to the statute that Congress passed, they have 6 months to submit the application. So, it is due in August. We have requested some parts of the application early under some separate authority.

Mr. **Skelton**. Have you received the answers?

Mr. **Seraydarian**. Yes, we have received the answers.

Mr. **Skelton**. Timely?

Mr. **Seraydarian**. Yes.

Mr. **Skelton**. Counsel?

Mr. **Orban**. Yes; thank you, Mr. Chairman.

Does the EPA retain any oversight jurisdiction over the activities of the California Department of Health Services and, if so, have you monitored the California Department of Health Services performance in regard to keeping track of BKK?

Mr. **Seraydarian**. The answer to the question is "Yes." We have an oversight program. In the beginning we evaluated the State's inspection capabilities, that is the quality of their inspectors. We have shifted that in the last 6 months to evaluate their compliance program. Where we do find violations, we have the authority to take action if the State doesn't assure compliance by a certain date. We have done that already. We have issued orders in California with penalties to major companies.

Mr. **Orban**. Are the results of ground water monitoring inspections done by whatever State agency routinely sent to EPA for review?

Mr. **Seraydarian**. No.

Mr. **Orban**. Does EPA have any manner of knowing exactly what is contained in BKK and if any shortfall in meeting legal requirements of the landfill, short of receiving a complaint from or through the California Department of Health Services? In other words, do you receive all your information through them?

Mr. **Seraydarian**. As I mentioned, we changed in the last 6 months our oversight review. We now do independent inspections and based on those, we evaluate the State's compliance program. We had scheduled an inspection of all the major facilities in California this year, BKK included. The original inspection was delayed due to some problems at EPA with the individual inspector, but we do anticipate an inspection in the near future where we will evaluate compliance with the Federal requirements directly.

Mr. **Orban**. Thank you.

Mr. **Skelton**. Dr. Simpson.

Dr. **Simpson**. Are you aware of how many acres BKK presently has approved to handle hazardous wastes?

Mr. **Seraydarian**. I believe it is over 100 acres.

Dr. **Simpson**. OK. Out of their roughly 500 total acres, do you know what criteria were used to determine which 150 acres were to be approved?

Mr. **Seraydarian**. No; that gets into the split between the State statutory authority under the Porter-Cologne Act versus the Hazardous Waste Management and the designation of the area actually occurred before the hazardous waste statute.

Dr. **Simpson**. Has there been any determination about the remaining 350 acres and whether they will be approved at some point to accept hazardous wastes?

Mr. **Seraydarian**. That determination would be made by the State. EPA would require that any new areas would have to meet all the Federal requirements.

Dr. **Simpson**. What sort of coordination was done in the past in approving the 150 acres?

Mr. **Seraydarian**. Well, since the site actually started operating in 1963, I believe, the lead was probably with the Regional Water Quality Control Board, and that authority actually created the classification system that exists in the State now, class I, class II. So, you would have to go back to the original review to get an answer to that question.

Dr. **Simpson**. OK. Thank you.

Mr. **Skelton**. Thank you, Mr. Seraydarian. We appreciate your testimony today and your being with us. I understand you will be with us the rest of the day and you are accompanied by Mr. John Zemaitis. Thank you so much.

We next have a panel consisting of John Hinton, southern regional director of the California Department of Health Services; Richard Harris of the Los Angeles region, California Regional Water Quality Board; William Sylte, chief, deputy executive officer of the California Air Resources Board; Edward Camarena, director of enforcement, South Coast Air Quality Management District; and Robert White, director of the Los Angeles County Department of Health Services.

Gentlemen, we welcome you. I would suggest that we hear from each of you briefly and then thereafter we will open up the entire panel for questions. Would you tell us who is whom, please, starting on my left?

Mr. **Harris**. Richard Harris, assistant executive officer of the Regional Water Quality Control Board in Los Angeles.

Mr. **Hinton**. I am John Hinton, regional administrator, for the Department of Health Services, hazardous wastes management branch.

Mr. **Camarena**. I am Ed Camarena, director of enforcement for the South Coast Air Quality Management District.

Mr. **Sylte**. I am Bill Sylte, the chief deputy executive officer of the Air Resources Board.

Mr. **Steel**. I am Douglas Steel. I am the deputy director of the public health programs for the county of Los Angeles, Department of Health Services, representing Robert White this morning.

Mr. **Skelton**. Then proceeding from my left to right, if you have a prepared statement, we will be pleased to hear from you. Thereafter, we will take questions.

PANEL CONSISTING OF RICHARD HARRIS; JOHN A. HINTON; EDWARD CAMARENA; WILLIAM SYLTE; AND DOUGLAS STEELE

TESTIMONY OF RICHARD HARRIS, ASSISTANT EXECUTIVE OFFICER, REGIONAL WATER QUALITY CONTROL BOARD, LOS ANGELES, CALIF.

Mr. **Harris**. In view of your crowded schedule, Mr. Congressman, you addressed in your May 3 letter some 10 questions, which really sort out into 6 areas. I would like to run through those briefly and then entertain any questions you might have.

On regulation, as you have already heard, the California Water Code or sections otherwise known as the Water Quality Control Act set up our authority over water quality protection. Devolving from that is the California Administrative Code, which sets forth certain guidelines for solid waste disposal. I might note that that is being revised currently to conform to the RCRA standards, although it may be more strict in some respects.

Devolving from both those regulations are the board's waste discharge requirements, which in this case are contained in an order 78-140, which apply to BKK.

You asked why we permitted BKK to take hazardous materials and, again, as you have already heard, it was based on some studies by the California Department of Water Resources of hydrology and geology for the site. Those studies were later amplified and confirmed in part by some consulting work done for the discharger.

You asked if we do any health studies on the landfill. No. We are specifically charged with protecting water quality, not with public health. You asked about ground water studies. We monitor, and we have caused BKK to monitor, downstream wells and this monitoring has shown no effects from the landfill.

We also monitor, and they monitor, barrier wells. There are two barriers at the landfill site at canyons and any water that may be intercepted below those barriers is monitored periodically. We see some trace quantities of some constituents in these barrier wells, but no indication of any significant migration from the landfill.

You asked about industry review of our requirements and our tentative requirements. Our procedure is to send out tentative requirements as far in advance of our hearings—probably in the case of a major dumpsite like this, 30 to 60 days—to all known interested parties. To my knowledge, there were no specific small businesses addressed or that we knew to be interested at that time.

That would conclude my summary.

[Questions to and responses from the California Regional Water Quality Control Board follow:]

California Regional Water Quality Control Board,
Los Angeles Region,
Los Angeles, Calif., May 23, 1983.

Hon. Ike Skelton,
Chairman, Committee on Small Business, Subcommittee on Energy, Environment and Safety Issues Affecting Small Business, House of Representatives, Washington, D.C.

My Dear Congressman Skelton: Enclosed in response to your letter dated May 3, 1983, are answers to your specific questions on the subject hearing. For your ready reference, your questions are repeated before each of the responses.

I will be attending your hearing or will be represented by my Assistant, Richard A. Harris.

Very truly yours,

Raymond M. Hertel,
Executive Officer.

Response of California Regional Water Quality Control Board, Los Angeles Region

1. In 1975 the CRWQCB authorized the BKK Landfill suitable to accept hazardous waste. Why? At that time how long was BKK authorized to accept hazardous waste?

The Board's waste discharge requirements (Attachment 1) were issued after study of the site by the California Department of Water Resources (DWR). Attachments 2 and 3 are reports of that work. Later work by a consultant for the company confirmed DWR's work and is attached as Attachment 4. There is no expiration date on the requirements.

2. Submit the analysis performed to determine the suitability of the BKK Landfill to accept hazardous wastes.

Please see No. 1.

3. Does the CRWQCB have regulatory authority over the BKK Landfill? If not, please explain the deregulating of CRWQCB's authority over the operations of the BKK Landfill.

Yes. The Board's authority is specified in the California Water Code, a copy of pertinent section of which is enclosed as Attachment 5. Additional regulations are included in the California Administration Code, a copy of pertinent sections of which is also attached (No. 6).

4. Has the CRWQCB conducted or commissioned any health studies on the operation of the BKK Landfill?

No. The Board is specifically charged with protection of water quality. Health studies have been done by other agencies, however, including the State and County Departments of Health Services, and the air pollution authorities. We understand that they will address this issue.

5. Submit all health studies conducted or commissioned by CRWQCB on the BKK Landfill.

Not applicable.

6. What types of geological and hydrological characteristic studies were conducted around the BKK Landfill prior to its acceptance of hazardous wastes?

Please see No. 1

7. Since the BKK Landfill's operations as a Class I site, have studies been conducted on the groundwater tables below the BKK Landfill?

Enclosed (Attachment 7) are representative, recent samples of water from wells below (downgradient) from the landfill. (There is no water beneath the landfill.) These analyses do not indicate any effects from the landfill on the water table.

8. Submit all studies on groundwater table quality below the BKK Landfill and water runoff quality conducted or commissioned by CRWQCB.

Please see No. 7.

9. If and when the above studies were conducted or commissioned were industry authorities allowed to review the findings and conclusions prior to public release?

Our practice is to circulate copies of tentative requirements to all known interested parties as much as possible in advance of a Board action on a case. This notice would include governmental agencies, water companies and citizen's groups known to be interested in a particular discharge. The discharger is, of course, also sent a copy of the tentative requirements. Aside from the above there is generally no specific review by industry authorities or others.

10. Submit all policy letters and background material sent from or received by the CRWQCB and the Ben K. Kazarian Corporation regarding the BKK Landfill.

Based on a telephone conversation with your counsel, Mr. Russ Orban, we understand that you are seeking material regarding problems and how they were resolved. A review of our files for the last 5 years indicates no violations of the Board's requirements. Attachment 8 include some correspondence dealing with rainwater runoff sampling we imposed on the company in the past two years and which we believe is illustrative of what you are seeking.

Mr. SKELTON. Thank you. Mr. Hinton.

TESTIMONY OF JOHN A. HINTON, REGIONAL ADMINISTRATOR, SOUTHERN REGION, DEPARTMENT OF HEALTH SERVICES, STATE OF CALIFORNIA, LOS ANGELES, CALIF.

Mr. HINTON. Thank you very much. I would like to thank the chairman and the members of the committee for the opportunity to testify.

In the interests of time I will restrict my comments to those questions which seem to be the exclusive purview of the Department of Health Services and will not in any way overlap the jurisdiction of the other agencies that are represented at this table.

The U.S. Environmental Protection Agency has the primary authority for administering the Resource Conservation and Recovery Act. RCRA provides for the delegation of that authority for various States. Authority is usually granted in phases. Phase I, the State is authorized to administer the RCRA program for 40 CFR Part 261, which is hazardous waste identification, 262, general standards, 263, transporter standards and 265, interim status.

Phase II authorization permits the State to administer the program with respect to component A, storage and treatment; component B, incinerators; component C, landfills.

The State of California currently has phase I and phase II–A authorizations. Full authorization must by granted by January 26, 1985, otherwise the entire program reverts back to the EPA.

The State, under part I authorization, issued an interim status document to BKK and enforces the provisions of that document. The State is not currently authorized to issue a final permit. The U.S. EPA has begun the process of the issuance of that final permit. It is anticipated that the permit will be a joint EPA/State permit. There is no formal relationship between the California Department of Health Services and the city of West Covina with regard to BKK.

The BKK landfill is currently in compliance with the Resource Conservation and Recovery Act.

The State of California in conjunction with EPA will process a final permit for the landfill. The State plans to incorporate within the permit any conditions of operation and monitoring that are deemed necessary to eliminate adverse effects on the environment due to the operation of the landfill. Based on the analysis of air monitoring data collected during the period of July 19 through October 15, 1982, the department has concluded that there is no short-term health effects and minimal long-term health effects on the residents of West Covina associated with the landfill.

The California Department of Health Services inspects the BKK landfill at least four times annually. The last inspection was conducted approximately 3 weeks ago and there were no violations found.

The State of California has not as yet developed any alternative sites to BKK. However, the State participated in the Southern California Association of Governments in the Southern California hazardous waste siting project. The purpose of that project was to identify possible alternatives to class I disposal sites in the 7-county, southern California area. Nine possible sites were identified in San Bernardino County, the Bristol Lake area; in Riverside County, Ford Dry Lake; in Imperial County, the Black Hills area, Fish Creek Mountains; San Diego County, Ocotillo Wells are in Otay; in Orange County, the Fremont Canyon area; and in Los Angeles County, the Towsley Canyon area.

That concludes my statement.

[Questions to and responses from Mr. Hinton follow:]

DEPARTMENT OF HEALTH SERVICES,
HAZARDOUS WASTE MANAGEMENT BRANCH,
Los Angeles, Calif., June 2, 1983.

Hon. IKE SKELTON,
Chairman, Small Business Subcommittee on Energy, Environment and Safety, Washington, D.C.

DEAR MR. RUSS ORBAN: Attached are the answers to the questions submitted for the Department's response. I shall be available to testify at the hearing on June 3, 1983.

If you need further information, please call me.

Sincerely,

JOHN A. HINTON, P.E.,
Regional Administrator.

1. Explain the regulatory relationship between the CDHS and U.S. Environmental Protection Agency, the California Department of Health Services and Ben K. Kazarian Landfill; CDHS and the City of West Covina regarding the BKK Landfill.

   USEPA has the primary authority for administering the Resource Conservation and Recovery Act. RCRA provides for the delegation of authority to the various states. Authority is granted in phases.

   - Phase I

     State is authorized to administer the RCRA program for 40 CFR Parts 261 (Hazardous Waste Identification and Listing), 262 (General Standards), 263 (Transporter Standards), and 265 (Interim Status).

   - Phase II (Facility Standards)

     Component A. Storage and treament

     Component B. Incinerations

     Component C. Landfills

   The State of California currently has Phase I and Phase II.A. Authorization. Full authorization must be granted by January 26, 1985. If the State fails to obtain full authorization by that date the program reverts back to EPA.

   The State, under Part I Authorization, issued an Interim Status Document to BKK and enforces the provisions of that document. The State is not currently authorized to issue a final permit. The U.S. Environmental Protection Agency has begun the process for the issuance of the final permit. It is anticipated that the Permit will be a joint EPA/State Permit. There is no formal relationship between CDHS and the City of West Covina with regard to BKK.

2. Is the BKK Landfill in compliance with current Class I regulations under the Resource Conservation and Recovery Act?

   Yes

3. What types of geological and hydrological characteristic studies were conducted around the BKK Lanfill prior to its acceptance of hazardous wastes?

   The Regional Water Quality Control Board has the responsibility for determining the suitability of a given site to receive hazardous wastes. Therefore, they are better equipped to anwer that question.

   However, attached is a copy of an October 2, 1963 report which seems to have formed the basis for the determination.

4. Explain the future plans, if any, the State has developed for the operations of the BKK Landfill.

   The State, in conjunction with EPA will process a final permit for the landfill. The State plans to incorporate within that permit any conditions of operation and monitoring that are deemed necessary to eliminate adverse effects on the environment due to the operation of the landfill.

5. Have studies been conducted or commissioned on the effects of the BKK Landfill's operations on the small businesses in West Covina?

   Submit all studies conducted or commissined involving the effect the operations of the BKK Landfill have on small businesses in the area.

   No. No studies have been conducted or commissioned on the effects of the BKK Landfill operations on the small businesses in West Covina.

6. What are the short-term and long-term health effects of the BKK Landfill on the residents of West Covina?

   Based on the analysis of air monitoring data collected during the period of July 19-October 15, 1982, the Department has concluded that there is no short-term health effects and minimal long-term health effects on the residents of West Covina associated with the BKK Landfill.

   A copy of that report is included.

7. Since the BKK Landfill's operations as a Class I site, have studies been conducted on the groundwater tables below the BKK Landfill?

   Yes. Groundwater monitoring is a requirement of the Interim Status Document. Groundwater monitoring results are required to be sent to the Regional Water Quality Control Board. A sample is attached.

8. Explain any other studies conducted or commissioned by CDHS on the conditions and operations of the BKK Landfill.

   CDHS inspects the BKK Landfill at least twice a year to determine compliance with Interim Status conditions. Additional studies are conducted pursuant to complaints and other information that might indicate a problem.

9. Submit all policy letters and background material sent from or received by the CDHS and the following entities: Environmental Protection Agency, Ben K Kazarian Corporation and related divisions of CDHS regarding BKK Landfill.

   The following is a list of all the policy letters and background material regarding the BKK Landfill available in the Southern Regional office.

Policy Letters and Background Material

BKK LANDFILL

Date	Letter Memo	To	From
July 9, 1979	Letter	Clarence Gieck	Brad Parsons
December 27, 1979	Letter	Clarence Gieck	James Stahler
October 8, 1980	Letter	Nevin Brown	Harvey F. Collins
October 6, 1980	Memo	Harvey Collins	Raymond Neutra, M.D.
October 23, 1980	Memo	Donald O. Lyman	Harvey F. Collins
October 23, 1980	Memo	Peter Weiner	Office of Legal Services
October 27, 1980	Memo	Carla Bard	Clint Whitney
October 27, 1980	Testimony		Harvey Collins
October 27, 1980	Statement		Donald O. Lyman, M.D.
December 1980	Study		WPJ
January 5, 1981	Letter	Donald Bright	Peter A. Rogers
July 17, 1981	Memo	Peter A. Rogers	Howard K. Hatayama
July 15, 1981	Memo	Elgar Stephens	Michael L. Kiado
July 23, 1981	Memo	Michael L. Kiado	James L. Stahler
July 27, 1981	Letter	Eric E. Lemke	Peter A. Rogers
November 16, 1981	Letter	Chester.Shearer	Peter A. Rogers
November 25, 1981	Memo	Steve Williamson	Harvey E. Collins
June 1, 1982	Memo	Robert Stephens	Norman Gravitz
June 29, 1982	Press Rel.		Florence Pearson
June 29, 1981	Letter	B.T. Collins	Kent Stoddard
July 1, 1982	Report		Dept. of Health Services
October 19, 1982	Letter	Michael Miller	Beverlee Myers
October 28, 1982	Letter	Clarence Gieck	Peter A. Rogers
November 3, 1982	Letter	Resident	Florence Pearson
January 5, 1983	Letter	Clarence Gieck	Peter A. Rogers
January 27, 1983	Letter	Joseph R. Johnson	John A. Hinton
January 28, 1983	Letter	J. Johnson	Harry Seraydarian-EPA
February 4, 1983	Letter	Joe Johnson	Tom Jones
February 23, 1983	Letter	Joseph Johnson	Jan Radimsky
March 08, 1983	Letter	Joseph Johnson	Peter A. Rogers
March 16, 1983	Memo	Peter Rogers John Hinton	Jan Radimsky
March 21, 1983	Letter	Clarence Geick	Peter A. Rogers

10. Has the State developed any alternative sites for the disposal of toxic wastes?

The State has not developed any alternative sites. However, the State participated with the Southern California Association of Governments in the Southern California Hazardous Waste Siting Project. The purpose of the Project was to identify possible alternative Class I disposal sites in the seven County Southern California area. Nine possible sites were identified.

San Bernardino County

Bristol Lake Area

Riverside County

Payzawd Dry Hole

Ford Dry Lake

Imperial County

Black Hills area

Fish Creek Mountains

San Diego County

Ocotillo Wells Area

Otay

Orange County

Fremont Canyon Area

Los Angeles County

Towsley Canyon Area

Mr. SKELTON. Mr. Camarena.

TESTIMONY OF EDWARD CAMARENA, DIRECTOR OF ENFORCEMENT, SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT, EL MONTE, CALIF.

Mr. CAMARENA. Thank you, Mr. Chairman, Congressman Torres.

The South Coast Air Quality Management District under the California Health and Safety Code is designated as the agency, the local and regional agency, with the sole and exclusive——

Mr. SKELTON. Can I ask an elementary question, Mr. Camarena? You are with the South Coast Air Quality Management District.

Mr. CAMARENA. That is correct.

Mr. SKELTON. Mr. Sylte is with the California Air Resources Board.

Mr. CAMARENA. That is correct.

Mr. SKELTON. Is that overlapping? Where do you all fit with each other?

Mr. CAMARENA. I think our testimony will cover——

Mr. SKELTON. Just answer my question, please.

Mr. CAMARENA. The South Coast Air Quality Management District has prime responsibility for control of air pollution from nonvehicular sources. The Air Resources Board has oversight authority to make sure that we do our job.

Mr. SKELTON. Thank you.

Mr. **Camarena**. The Air Quality Management District has conducted two basic air quality studies in the area around BKK. The first is a continuing study of vinyl chloride in the atmosphere around BKK and the second one was a joint project with the State Department of Health Services and the Air Resources Board. I will describe each of these.

In late 1980, we had a large increase in the number of odor complaints from people living in the immediate vicinity of BKK. As a result of those complaints, the district required expansion of the existing gas collection and incineration system, which was composed of a series of gas wells to extract gas from the landfill. These wells were vented to a flare, which burned the odorous gases.

Testing of the efficiency of that system revealed high concentrations of vinyl chloride gas. Vinyl chloride is a gas which is used in industry to produce a number of products made from polyvinyl chloride plastic. These products include floor tile, phonograph records, fabric for upholstery of automobiles and so on.

Vinyl chloride is the only carcinogenic substance, or cancer causing substance, for which there is an ambient air quality standard, which was adopted by the California Air Resources Board in 1978. Although we recognized that the gas collection and incineration system was efficiently burning off the collected vinyl chloride, at that time the gas collection and incineration system was still under development and not all of the landfill gas was being collected and incinerated.

We believed, therefore, that the air quality standard might be exceeded in the vicinity of the BKK landfill and immediately began to monitor the air around the landfill. We did determine that the vinyl chloride standard was being exceeded on a number of occasions.

If I may have the first slide?

After some testing, we determined that the areas of highest concentration were immediately south of the landfill, where we set up two air monitoring stations. We have monitored the air at those two stations since 1981. We have worked with other agencies, the State Department of Health Services, Air Resources Board, Regional Water Quality Control Board and the State Solid Waste Management Board and the city of West Covina through a task force to come up with methods to resolve the problem.

The next slide shows the effect of the expansion of the gas collection and incineration system. The vertical axes it shows the number of days that the air quality standard has been exceeded at these two stations and across the bottom is the months of each year since 1981, when we started the monitoring. As you can see, the air quality has steadily improved since the gas collection and incineration system was installed and has been successively upgraded.

The month of May, this month that just passed, was the first month when the ambient air quality standard for vinyl chloride was not exceeded. The problem is not yet solved. As we move into the summer, we will see an excess of the air quality standard as we get more stable weather conditions and we think that additional controls are required.

The first study measured only vinyl chloride. We were also concerned with other emissions, emissions of other potentially toxic or carcinogenic materials. Working with the Air Resources Board and the Department of Health Services, a series of target compounds were selected for monitoring in a comprehensive 3-month study during the summer of 1982.

We had six monitoring stations set up all around the landfill and the Air Resources Board and the Air Quality Management District analyzed the air samples. The data was interpreted by the Health Department and these are their conclusions, that there is no public health emergency, that the levels were well below the toxic noncarcinogenic action level, that they did estimate, however, that because the levels were in excess of those found in other areas of the basin, there was an excess cancer risk of 5 in 100,000, that for the people living in the immediate vicinity of the landfill where these higher levels were found that that excess cancer risk would result in an expectation of no additional cases of cancer as a result of the 7-year exposure.

It was also concluded that the levels were such that there should be additional control measures because of the chlorinated organics and other compounds, as well as the vinyl chloride.

As a result, the Air Quality Management District has filed a petition with the hearing board of the district for an order for abatement, which would require further controls at BKK. The basics of that are a plan to further expand the gas collection and incineration system; to implement that plan as soon as possible; to fund the continued monitoring for vinyl chloride in the atmosphere and to install monitors to check the effectiveness of that gas collection system.

That abatement order hearing will probably be held in the month of July and if the abatement order is granted, BKK would be required to comply with those requirements. Failure to comply would result in up to a $6,000 per day penalty.

Mr. Chairman, that concludes my remarks.

[Mr. Camarena's prepared statement follows:]

Prepared Statement of Edward Camarena, Director of Enforcement, South Coast Air Quality Management District, El Monte, Calif.

The California Health and Safety Code designates the South Coast Air Quality Management District as the sole and exclusive local agency within the South Coast Air Basin with the responsibility for comprehensive air pollution control and further provides that the District has the primary responsibility for the control of air pollution from all sources other than emissions from motor vehicles. As required by law, the District program has focused on those air contaminants for which the Federal Environmental Protection Agency and the California Air Resources Board have adopted ambient air quality standards.

In recent years, there has been a growing concern with respect to toxic air emissions for which with one exception, no ambient air quality standards have been set. The District has found that, in addition to a number of industrial sources, landfills can be a source of odors and potentially toxic air emissions.

In late 1980, odor complaints from residents in the vicinity of the BKK landfill (Class I) in West Covina prompted the District to issue violation notices alleging violations of Rule 402 (nuisance) and Section 41700 (nuisance) of the California Health and Safety Code. Odors emanating from the landfill were determined to originate almost entirely from the anaerobic decomposition of wastes within the fill rather than directly from the daily disposal activities.

The District required expansion of an existing gas collection and incineration system composed of a series of gas wells venting to a flare. Testing of the composition of the collected landfill gases revealed concentrations of vinyl chloride gas ranging up to 2,000 ppm.

Vinyl chloride is a colorless, odorless gas used principally to produce polyvinyl chloride (PVC), which is used to manufacture products such as floor tile, pipe, electric insulation, phonograph records and fabric for automobile interiors. Vinyl chloride is a known carcinogen (cancer-causing substance) for humans and other animals.

The California Air Resources Board (ARB) adopted an ambient air quality standard for vinyl chloride of 0.01 parts per million parts of air (PPM), 24-hour average, a level that will minimize the long term risk to the general population.

Although the collected gases at BKK containing high concentrations of vinyl chloride were efficiently destroyed by the flare, it was known that not all of the landfill gas was being collected and that emissions from the landfill surfaces could still be a problem.

The South Coast Air Quality Management District immediately began monitoring ambient air in the residential areas around BKK to determine whether the remaining uncontrolled emissions could result in an exceedance of the ambient air quality standard for vinyl chloride. It was found that the vinyl chloride standard was being exceeded off-site about fourteen days a month and the maximum 24-hour average concentration was 0.05 ppm (five times the air quality standard).

The District immediately notified the state and local departments of health services and requested an evaluation of the data. A senior official of the Epidemiological Studies Section of the California Department of Health Services stated in a July 1981 letter to the District commenting on the vinyl chloride measurements taken in May and June 1981, near the BKK landfill: "We believe that these levels of vinyl chloride pose no imminent health hazard to the surrounding population, but they are of sufficient concern to require that effective mitigation measures be taken at the earliest possible time."

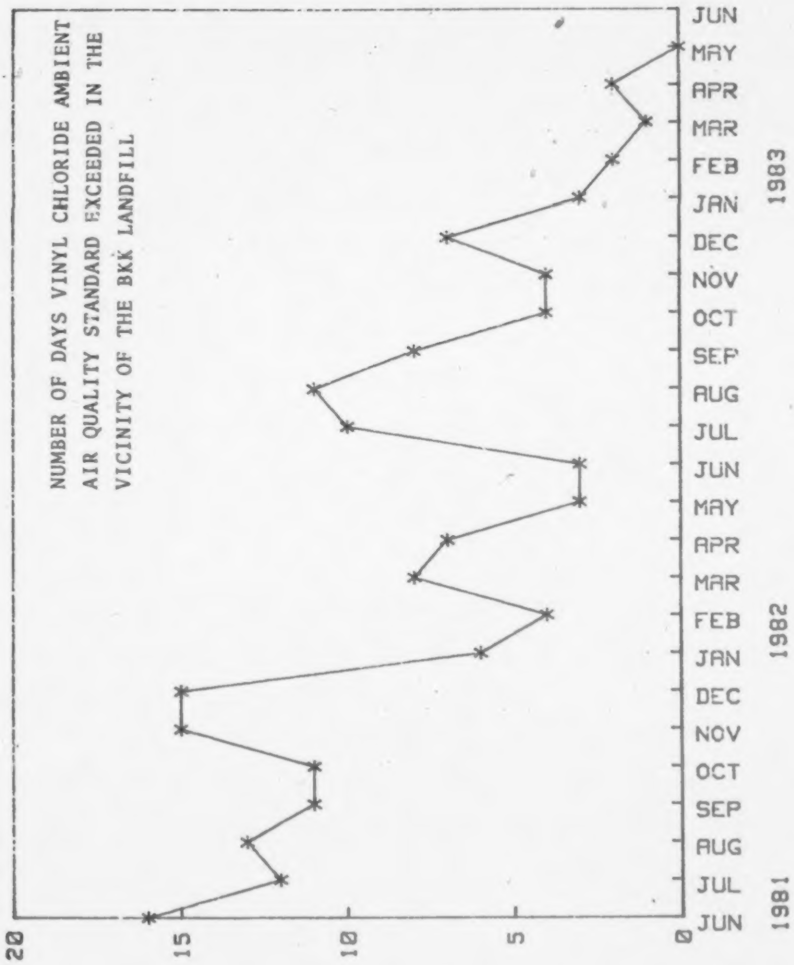
An interagency task force was created to develop a program to update emission control efforts in the West Covina landfill area. The task force, which included the District, the City of West Covina, Los Angeles County Health Department, State Solid Waste Management Board, State Department of Health Services and the Regional Water Quality Control Board began meeting regularly in May 1981 to develop ways to further reduce odors and emissions of volatile organic compounds, including vinyl chloride, at the landfill site. BKK Corporation also was prohibited by the State Department of Health Services from accepting industrial wastes containing vinyl chloride.

The task force implemented a program of additional gas well installation and waste gas incineration designed to reduce the concentration of odorous gas emitted to the atmosphere. Such incineration also controls vinyl chloride emissions. Since the implementation of this program in 1981, there have been fewer odor complaints and vinyl chloride concentrations have been reduced significantly.

The attached graph shows the number of days each month since June of 1981 that the ambient air quality standard for vinyl chloride has been exceeded in the vicinity of the BKK landfill. It shows the success of the emissions control program. The frequency of exceeding the standard has declined steadily since June of 1981, when the standard was exceeded on sixteen days to an average less than two per month so far this year.

Although the chart shows no exceedances recorded in May of this year, we expect that the current emissions are sufficient to cause periodic exceedances as we get more stable weather in the summer.

During July-October 1982 the District, in cooperation with the State Department of Health Services and the California Air Resources Board, conducted an extensive monitoring project to determine the concentration and health impact of other potentially toxic emissions from the BKK landfill. It was concluded



NUMBER OF DAYS VINYL CHLORIDE AMBIENT AIR QUALITY STANDARD EXCEEDED IN THE VICINITY OF THE BKK LANDFILL that certain compounds were present at levels higher than at the selected control site (Pico Rivera). The State Department of Health Services further concluded that:

A. even at the highest observed concentrations the substances measured were present at concentrations well below their threshhold for toxic, non-carcinogenic action;

B. at the low level of exposure it is not possible to calculate excess cancer risks. However, worst case estimates of the individual cancer risks suggests that those living immediately adjacent to the landfill may have accumulated excess risks to date of 5/100,000;

C. based on the estimated exposure population within a one-mile radius, no additional cases of cancer are expected from exposure to date and exposure levels are declining;

D. the individual cancer risks are at a relatively low level and do not constitute a public health emergency;

E. since the stations around the site are not known to be near other sources of emissions of these compounds (dry cleaning establishments, plastics products manufacturers, metal finishing industries, etc.), the data suggest that the BKK site is a source of these compounds. The elevated levels of the chlorinated compounds in particular indicate a need for mitigation measures such as expansion of the landfill gas gathering system, upgraded maintenance programs, and changes in handling of wastes containing these compounds; and

F. further action is also mandated by the continued, periodic exceedances of the State's Ambient Air Quality Standard for vinyl chloride of 0.01 ppm (10 ppb).

The South Coast Air Quality Management District has recently filed a petition for an Order for Abatement which would:

A. require a plan to expand the existing gas collection and incineration system to assure no further exceedances of the vinyl chloride ambient air quality standard;

B. require implementation of the plan as soon as possible after approval by the Executive Officer and according to a schedule specified by the Hearing Board;

C. require BKK to contract for monitoring for vinyl chloride; and

D. require BKK to install monitors within the fill to check effectiveness of the gas collection system.

The controls requested in the petition for the Order for abatement would further reduce emissions of odors and potentially toxic air contaminants. Our experience indicates that these types of controls are quite effective as the results of our studies have indicated.

South Coast
AIR QUALITY MANAGEMENT DISTRICT
9150 FLAIR DRIVE, EL MONTE, CA 91731 (213) 572-6200

May 27, 1983

Honorable Ike Skelton
Chairman, Small Business Subcommittee
on Energy, Environment and Safety
H2-569, House Annex II
Washington, D.C. 20515

Attention Mr. Russ Orban

Dear Mr. Chairman:

Attached are the answers to questions submitted to us. Mr. Edward Camarena, Director of Enforcement, will be available to testify at the June 3, 1983 hearing of the Small Business Subcommittee on Energy, Environment and Safety.

Please call me if there is any additional information I can provide.

Sincerely,

J A Stuart

J. A. Stuart
Executive Officer
(213) 572-6400

JAS:eo

Attachs.

ANSWERS TO QUESTIONS
FROM THE SMALL BUSINESS SUBCOMMITTEE
ON ENVIRONMENT AND SAFETY

Q1. Does the South Coast Air Quality Management District have any regulatory authority over the BKK Landfill?

A1. Yes. Section 40000 of the California Health and Safety Code provides that local and regional authorities such as the South Coast Air Quality Management District have the primary responsibility for control of air pollution from all sources other than emissions from motor vehicles, which are the responsibility of the California Air Resources Board. Section 40001 provides that air quality management districts shall adopt and enforce rules and regulations and shall enforce all applicable provisions of the state law.

Section 41700 prohibits emissions of air contaminants from any source whatsoever in quantities that would cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public or which endanger the comfort, repose, health or safety of any such persons or the public or which cause or have a natural tendency to cause injury or damage to business or property.

Q2. Have studies been conducted or commissioned by the District on air quality surrounding the BKK Landfill in West Covina?

A2. Yes.

Q3. If studies have been conducted on the air quality in the greater West Covina area, what kind of air studies were conducted?

A3. The South Coast Air Quality Management District has continuously monitored the ambient air around the BKK Landfill for vinyl chloride since June of 1981. The attached graphs plot the data and show there has been a significant reduction in both the frequency of exceeding the State ambient air quality standard for vinyl chloride and in the maximum levels attained. In 1981, the standard was exceeded 14 days per month on the average. So far this year, the average is two days per month.

In addition, the District conducted a joint three-month study for eight other potentially toxic air contaminants during the summer of 1982. This study was conducted jointly with the California Department of Health Services and the California Air Resources Board. The planning portion of the study included participation by the City of West Covina and the Los Angeles County Department of Health Services. Air sampling was conducted by the South Coast Air Quality Management District. The analyses were conducted by the laboratories of the District and the Air Resources Board and the health risk analysis was done by the California Department of Health Services. A copy of the report is attached.

Q4. What will be the long term air quality effects if the BKK Landfill continues to operate at current levels?

A4. Unless additional controls are installed, there would be a gradual increase in emissions of odors and potentially toxic air contaminants. The District has recently filed a petition for an Order for Abatement which would:

A. require a plan to expand the existing gas collection and incineration system to assure no further exceedances of the vinyl chloride ambient air quality standard;

B. require implementation of the plan as soon as possible after approval by the Executive Officer and according to a schedule specified by the Hearing Board;

C. require BKK to contract for monitoring for vinyl chloride; and

D. require BKK to install monitors within the fill to check effectiveness of the gas collection system.

The controls requested in the petition for abatement order would further reduce emissions of air contaminants. Our experience indicates that these types of controls are quite effective as the results of our studies have indicated.

Q5. Is there a possibility that indoor air quality in buildings and homes surrounding the BKK Landfill pose a health danger?

A5. We have no hard data at this time with regard to indoor air quality in the BKK area. Measurements would most likely be inconclusive with respect to the source since many of these air contaminants are present in the homes as a result of the storage in homes of cleaning fluids, solvents, charcoal lighter fluid, gasoline for lawn mowers and other small motors, aerosol cans of various types, perfumes, hair sprays, paints, paint thinners, finger nail polish remover, medicines, etc.

With respect to the contribution from outdoor contaminants which may originate from BKK, it should be noted that common summer time practice in homes that are not air conditioned is to keep windows open during the daytime and closing them in the evening. This most likely results in a lesser exposure since our experience is that the highest concentrations outdoors are present in the evening. Thus, the act of closing the windows in the evening would result in somewhat cleaner air inside than outside during the evening hours when air contaminants from BKK are at the highest concentration.

With respect to air conditioned homes and buildings that are normally closed, we would expect that the results would be lower peak levels but higher minimum levels within the building. The net result being essentially the same overall exposure to BKK emissions in the long term as being outdoors.

Q6. If and when studies were conducted or commissioned, were industry authorities allowed to review the findings and conclusions prior to public release?

A6. No. Data on the continuing monitoring for vinyl chloride is released periodically to all those who have expressed interest in receiving them. There is no review of that data by BKK or any other industry prior to its release.

With respect to the joint study for other toxic air contaminants that data, too, was released to all concerned as it was available. The conclusions were not discussed by this District with BKK or other industries prior to release.

Q7. Submit all policy letters and background sent from or received by the District and BKK Corp. regarding the landfill.

A7. Copies attached.

Q8. Submit all air quality studies conducted or commissioned by the District on the BKK landfill.

A8. Copies attached.

Q9. Submit future plans, policies, if prepared, regarding the monitoring of the air quality surrounding the BKK landfill.

A9. The South Coast Air Quality Management District plans to continue monitoring for vinyl chloride indefinitely. Additional monitoring for other contaminants similar to the three-month joint study are under consideration but there are no definite plans at this time.

Mr. **Skelton**. Thank you, sir. Mr. Sylte.

TESTIMONY OF WILLIAM SYLTE, CHIEF DEPUTY EXECUTIVE OFFICER, CALIFORNIA AIR RESOURCES BOARD

Mr. **Sylte**. Thank you, Mr. Chairman.

Mr. Camarena has stolen a good deal of my thunder. As you probably note, there are dual responsibilities in this area between the State agency and the local area agency. I believe that from Mr. Camarena's remarks you have been given a basic understanding of the role that the Air Resources Board has played. We have been involved basically in a backup role, supporting the local Air Quality Management District with some technical assistance and also advising the Department of Health Services on air quality matters at the State level.

I think the result of our effort—and I certainly concur with Mr. Camarena—has been substantial progress made in the reduction of vinyl chloride emissions at the landfill site. There are many fewer violations of the State's standard for vinyl chloride than there once were but those violations do continue today and so the job is not complete. More reduction is going to be required.

The potential for air emissions from the landfill will continue for a very long period of time and therefore the matter will continue to need attention by the district and by the State.

Unless you would like me to go into the detailed answers to your written questions, I think I would like to stop at this point and respond to your questions.

[Mr. Sylte's prepared statement follows:]

[Attachments to Mr. Sylte's prepared statement are on file with the subcommittee.]

Prepared Statement of William Sylte, Chief Deputy Executive Officer, California Air Resources Board

Air pollution control in California is geared to the protection of public health from adverse effects of air quality. The Board shares this responsibility with local air pollution control districts. Our Board has been cooperating with the South Coast Air Quality Management District in monitoring emissions from the BKK landfill. We have also been providing information to the California Department of Health Services.

Our investigations have placed emphasis on emissions of vinyl chloride gas, for which the Board has promulgated an ambient air quality standard of .010 parts per million averaged over a 24-hour period. Our joint monitoring effort with the District has shown that the standard has been exceeded at the landfill and that vinyl chloride is in the ambient air nearby. Other hydrocarbons have also been measured in the air at the BKK landfill. Recently, in response to the recommendations of the District and the Board, BKK has been expanding its gas collection system at the landfill and making other changes or commitments toward abating its landfill air emissions.

The details of our involvement are addressed in the attached response to your Subcommittee's inquiry. We would be pleased to go over our responses with you and to answer any questions you may have.

Mr. **Skelton**. Thank you.

I previously introduced the next gentleman as Robert White and it is really Douglas Steele; is that not correct?

Mr. **Steele**. Yes, sir.

Mr. **Skelton**. Give us your title again, please.

TESTIMONY OF DOUGLAS STEELE, DEPUTY DIRECTOR, PUBLIC HEALTH PROGRAMS, DEPARTMENT OF HEALTH SERVICES, COUNTY OF LOS ANGELES, LOS ANGELES, CALIF.

Mr. STEELE. Thank you, Mr. Chairman, Congressman Torres.

My name, again, is Douglas Steele. I am deputy director of public health programs with the county of Los Angeles Department of Health Services.

The county of Los Angeles Department of Health Services and the city engineer of the city of West Covina were jointly designated the coenforcement agencies for nonhazardous solid waste management matters by resolution of the West Covina City Council in July 1977. The State Department of Health Services is responsible for permitting and enforcement concerning the hazardous waste portion of the landfill.

The responsibilities of the coenforcement agencies are to jointly prepare, issue, and enforce the State-required solid waste facility permit and enforce the State minimum standards for solid waste handling and disposal. In addition, we have responsibilities as the health officer for the county of Los Angeles to insure appropriate environmental sanitation measures at the facility and to watch out for vector control kinds of problems.

The county of Los Angeles Department of Health Services has not conducted or commissioned studies of the effects of the BKK landfill on area residents or small businesses, except the odor studies required in the solid waste facilities permit, issued jointly by the city of West Covina and my department.

I understand that this material has been provided to you by the city of West Covina.

Department epidemiologists have reviewed and provided commentary upon the various studies undertaken by other agencies. These studies include the investigation of odorous and volatile compounds for the BKK class I landfill site in the city of West Covina. This study, required in the solid waste facility permit, was conducted in 1980 by the environmental engineering program of the University of Southern California at the request of the BKK Corp.

Second, the BKK landfill odor study by Eutek, Inc. of Sacramento, Calif. This study, to determine the effectiveness of odor control measures recommended in the USC study, was undertaken at the request of the city of West Covina.

Third, a review of the expanded air monitoring study conducted in the residential areas surrounding the landfill undertaken by the South Coast Air Quality Management District and the State Department of Health Services, which has just been described to you by Mr. Camarena.

It is the opinion of the county of Los Angeles Department of Health Services, based upon review of the records and reports pertaining to the above studies, that since these studies do not indicate significant emission of toxic materials that would expose the surrounding community, any health effect survey or study could not be related to emissions from BKK landfill. Epidemiological experts from our department feel that the BKK landfill does not constitute a threat to the health of area residents or small businesses of West Covina.

In September 1980, the county of Los Angeles Board of Supervisors directed the Department of Health Services to post a qualified inspector full time for a 90-day period at the BKK landfill. The purpose of this assignment was to monitor and report to the board on the methods and quantities of materials handled at the facility. We provided to your committee a copy of the report of the board of supervisors, in which we stated that during the 90-day period no violations of applicable State law pertaining to hazardous waste disposal were observed.

The county of Los Angeles is not involved in the daily operations of the landfill. Department of Health Services inspectors conduct weekly inspections of the nonhazardous solid waste disposal operations at the landfill, while responsibility for enforcement of the State hazardous waste control laws and regulations lies with the State Department of Health Services.

The city of West Covina conducts daily inspections of the facility in conjunction with enforcement of the city's unclassified use permit. No specific written instructions have been developed for residents or businesses with regard to issues surrounding hazardous spills occurring in the vicinity of the BKK landfill. The procedures that would be put into operation are those recommended to minimize exposure to potentially hazardous concentrations of chemical substances as follows:

Closing off streets to traffic in the area of the spill.

Closing off all businesses within a certain radius of the spill in accordance with the degree of hazard.

Coordinating with other response agencies to insure that affected residents or personnel are given proper medical attention.

Evacuation of the population in the area affected by the spilled emissions might become necessary, depending upon conditions. Evacuation orders under such circumstances are usually issued by the emergency response agencies, principally law enforcement in consultation with the fire department and with the Department of Health Services staff on the scene.

We have done a considerable amount of work trying to improve response time with regard to the handling of hazardous spills in the vicinity and think that within the next few months we will have procedures whereby response to such incidents can occur very rapidly.

I think that concludes my formal testimony, Mr. Chairman.

[Questions to and responses from the County of Los Angeles Department of Health Services follow:]

COUNTY OF LOS ANGELES • DEPARTMENT OF HEALTH SERVICES
313 NORTH FIGUEROA STREET • LOS ANGELES, CALIFORNIA 90012 • (213) 974-8101

May 20, 1983

The Honorable Ike Skelton, Chairman
United States House of Representatives
Subcommittee on Energy and Environment
and Safety Issues Affecting Small Business
H-2-569 - House Annex 2
Washington, D.C. 20515

Dear Mr. Skelton:

Thank you for giving us the opportunity to provide written and oral testimony before your subcommittee concerning, the County of Los Angeles Department of Health Services' activities at the BKK Landfill in West Covina.

Following are our responses to the concerns expressed in the questions you submitted:

1. Does the County of Los Angeles have any regulatory authority over the BKK Landfill?

The County of Los Angeles Department of Health Services and the City Engineer of the City of West Covina were jointly designated the co-enforcement agencies for non-hazardous solid waste management matters by resolution of the West Covina City Council in July, 1977. The State Department of Health Services is responsible for permitting and enforcement concerning the hazardous waste portion of the landfill. This designation action was approved by the State Solid Waste Management Board in August, 1977. The responsibilities of the co-enforcement agencies are to jointly prepare, issue and enforce the State - required Solid Waste Facility Permit and enforce the State Minimum Standards for Solid Waste Handling and Disposal. In accordance with the provisions of the enforcement agency designation, the County Department of Health Services may enforce only those permit requirements or State Minimum Standards which are directly health related. Those requirements or standards which are not health related are enforced by City staff. The Department of Health Services has for the past 2-3 years conducted weekly inspections at the landfill. In general, our inspections indicate that the landfill is in compliance with those requirements which are our responsibility to enforce. In those few incidents in which violations of the requirements have been found, the BKK Corporation has been quick and thorough in correcting and eliminating the condition.

2. Has the County of Los Angeles conducted or commissioned any health studies on the effects of the BKK Landfill on area residents and/or small businesses?

3. Submit all health studies conducted or commissioned by the County of Los Angeles on the BKK Landfill.

The County of Los Angeles Department of Health Services has not conducted or commissioned studies of the effects of the BKK Landfill on area residents or small businesses except the odor studies required in the Solid Waste Facilities Permit issued jointly by the City of West Covina and this Department. I understand that this material will be provided by the City. Department epidemiologists have reviewed and provided commentary upon the various studies undertaken by other agencies. These studies are: (1) "An Investigation of Odorous and Volatile Compounds for BKK Class I Landfill Site in the City of West Covina." This study, required in the Solid Waste Facility Permit, was conducted in 1980 by the Environmental Engineering Program of the University of Southern California (USC) at the request of the BKK Corporation. (2) "The BKK Landfill Odor Study" by EUTEK, Inc., of Sacramento, California. This study, to determine the effectiveness of odor control measures recommended in the USC study, was undertaken at the request of the City of West Covina. (3) An expanded air monitoring study conducted in the residential areas surrounding the landfill undertaken jointly by the South Coast Air Quality Management District and the State Department of Health Services.

It is the opinion of the County of Los Angeles Department of Health Services, based upon review of the records and reports pertaining to the above studies, that since these studies do not indicate significant emission of toxic materials that would expose the surrounding community, any health effect survey or study could not be related to emissions from BKK Landfill.

Epidemiological experts from our Department feel that the BKK Landfill does not constitute a threat to the health of area residents or small businesses of West Covina.

In September 1980, the County of Los Angeles Board of Supervisors directed the Department of Health Services to post a qualified inspector, full time, for a 90 day period at the BKK Landfill. The purpose of this was to monitor and report to the Board of Supervisors on the methods and quantities of materials handled at the facility. The report to the Board of Supervisors (Attachment I) stated that during the 90 day period, no violations of applicable State law pertaining to hazardous waste disposal were observed.

4. Submit all studies conducted or commissioned involving the effect the operations of the BKK Landfill have on small businesses in the area.

The County of Los Angeles Department of Health Services has not conducted or commissioned any studies involving the effect of the BKK Landfill upon the operation of small businesses in the West Covina area. The Draft Environmental Impact Report prepared by the City of West Covina prior to revising the Unspecified Use Permit issued to the BKK Corporation for the landfill contained a brief discussion of potential economic effects upon various businesses. This material is being submitted to you by the City of West Covina.

5. Is the County of Los Angeles involved in the daily operation of the BKK Landfill?

The County of Los Angeles is not involved in the daily operations of the landfill. Department of Health Services inspectors conduct weekly inspections of the non-hazardous solid waste disposal operations at the landfill, while responsibility for enforcement of hazardous waste laws and regulations lies with the State Department of Health Services. The City of West Covina conducts daily inspections of the facility in conjunction with enforcement of the City's Unclassified Use Permit.

6. Submit all policy letters and background material sent from or received by the County of Los Angeles and the Ben K. Kazarian Corporation regarding the BKK Landfill in Los Angeles County.

We have reviewed our files and copies of all policy letters and background material pertinent to your hearing are enclosed (Attachment II).

7. Explain the procedures taken if and when a hazardous waste spill occurs enroute to BKK Landfill in West Covina.

    a) Upon notification of a hazardous waste spill, Department of Health Services response personnel are assigned to investigate and make the proper assessment as to the type and degree of clean up that will be necessary.

    b) Information is obtained from emergency response agencies first on site (fire and law enforcement) regarding what is known about the composition of the material, the hauler, origin of the material, the amount spilled, whether the material is liquid, powder or solid, vapor or emissions, and whether the material is running into a storm drain or other property.

    c) Information is also obtained as to whether any personnel have been exposed, the types of symptoms manifested and whether emergency care may be needed.

    d) A procedure is being implemented whereby the first responders will take samples of the spilled material, as well as material remaining on the vehicle. This would expedite identification of the material. In addition, they will also be asked to perform basic qualitative tests such as pH and combustibility.

    e) Upon arrival by the Hazardous Waste Program personnel, information is obtained from the scene coordinator to get an update on the incident. On the basis of that information and additional field testing, an assessment is made as to the degree of potential or real hazard to response personnel, passers-by, residents of the community, also, as to the extent of clean up necessary to reduce the contamination level to an ambient level.

f) In order to achieve the above stated procedures, close cooperation is necessary between all emergency response agencies. To this end, a coordinating procedure has been developed to minimize the amount of time necessary to mitigate the hazard from the incident.

g) Where necessary, the Health Hazard Contingency Plan (Attachment III) will be implemented to provide expeditious warning and, should it be necessary, evacuation of endangered people.

8. Submit all procedures and written instructions afforded to the residents and businesses regarding the procedures to be taken when a hazardous spill occurs near the BKK Landfill that effects their daily lifestyles or business activity.

No specific written instructions have been developed for residents or businesses. The procedures that would be put into operation are those recommended to minimize exposure to potentially hazardous concentrations of chemical substances as follows:

a) Closing off streets to traffic in the area of the spill.

b) Closing off all businesses within a certain radius of the spill in accordance with the degree of hazard.

c) Coordinating with other response agencies to ensure that affected residents or personnel are given proper medical attention.

d) Evacuation of the population in the area affected by the spilled emissions may become necessary. Evacuation orders are usually issued by the emergency response agencies (Law Enforcement) in consultation with the Fire Department and the Health Department and the actual carrying out of the evacuation orders is done by the Law Enforcement Agency. The evacuation of the area may remain in effect until such time as the health hazard has been abated. (Refer to Health Hazard Advisory Contingency Plan.)

> Normally, this evacuation procedure becomes effective when individuals outside the immediate spill area complain of illness. Upon receipt of such complaints, the Fire Department will contact the Med-Alert system which initiates response procedures. These procedures may include determining which hospitals are to be used for treatment or dispatching field medical teams for on-site medical screening and referral.

I trust these responses will meet the needs of your subcommittee.

Very truly yours,

ROBERT W. WHITE
Director of Health Services

RWW:nm

cc: Mayor - City of West Covina
Each Supervisor
Attachments

Mr. SKELTON. Thank you, Mr. Steele.

Before calling on my colleague to begin the questions, I will review with those of you in the audience who are kind enough to be with us today the rest of the hearing, so you will have an idea as to what the nature of our inquiry will be. After this group is questioned, we will have two independent analysts, one from UCLA and from Stanford University. Then we will have the operators of the BKK Landfill Corp. to testify. We will break for a 30-minute lunch. Thereafter, we will develop the history of hazardous waste spills on Azuza Avenue and how that has affected the various small businesses there, through the Los Angeles County fire department, the Greater Los Angeles Solid Waste Management Association, a panel of small business owners and operators, the West Covina Chamber of Commerce and the Los Angeles Chamber of Commerce.

Then we will later have affected residents of the St. Martha's Parents Club and the Coalition of West Covina's Home Owners Association. We will end up, last but not least, with the mayor and related city departments and various task forces and, hopefully, we can get that done.

I might compliment the witnesses and panelists thus far. We are doing well on time.

Mr. Torres.

Mr. TORRES. I want to direct my question to Mr. Hinton. I asked a similar question of the EPA representative earlier, that if a complete record, including a detailed description of all hazardous wastes received at the BKK landfill since 1968 does not exist—we were told it does not—will your department and other related agencies assist this subcommittee in studying the manifests and the contents of the BKK landfill and assist in a comprehensive study and analysis of that data?

Mr. Hinton. The answer to that is yes; we will. Beginning approximately October of last year, all the manifests in the State of California have been placed on a computer, so that we now have data processing capability and we can recall that kind of information for the committee or anyone else who has need of that information.

Mr. Torres. I understand that your agency authorizes the transportation of hazardous waste from closing landfills or closed landfills to be brought to the BKK landfill? For example, Stringfellow. It is being cleaned up. I understand that hazardous waste from Stringfellow is being brought to BKK. Did your agency authorize the transportation of hazardous waste from Stringfellow to BKK?

Mr. Hinton. No. The only determination that is made by this agency is that hazardous material must go to an approved class I disposal site.

Mr. Torres. Why is BKK designated as that particular site?

Mr. Hinton. Well, BKK currently operates under a contract with the State Department of Health Services for the purposes of collecting the leachate that is currently being collected at Stringfellow. Now, under the terms of that contract, the BKK Corp., through their hauler arm, Chanellor & Ogden, collects that leachate and disposes of it. Currently, they are disposing of it at BKK landfill. That is not through the direction of the department.

Mr. Torres. Would the same case apply to the McColl hazardous waste site?

Mr. Hinton. The State, again, makes the determination that all hazardous material must go to a class I landfill. The contractor, through his bidding process, determines which class I landfill it will go to. It is not, at this point, determined that it will go to any landfill at all. It is my understanding that studies are still underway, looking into the possibility of incinerating that waste.

Mr. Torres. Thank you. I have no further questions, Mr. Chairman.

Mr. Skelton. Mr. Camarena, I want to ask you some basic questions, if I may. You discussed various gases. Is that not correct?

Mr. Camarena. That is correct.

Mr. Skelton. You mentioned one as being vinyl chloride.

Mr. Camarena. Yes.

Mr. Skelton. Would you tell us just what vinyl chloride is?

Mr. Camarena. Vinyl chloride is a gas, which is used to produce polyvinyl chloride, which is a solid material, which in turn is used to produce a number of products that we all use, such as phonograph records, floor tile, the fabric for upholstery of automobiles, and so on. In addition, up until 1974, vinyl chloride gas was used as a propellant in aerosal spray cans for such things as deodorants and what not.

Mr. Skelton. Now, did you find evidence of vinyl chloride in your tests?

Mr. Camarena. Yes; we did.

Mr. Skelton. Now, explain to us so we can understand it in layman's terms just what the results were.

Mr. Camarena. First of all, the vinyl chloride was deposited there as industrial wastes from at least one of four facilities in the Los Angeles area over the years. The gas was contained in a gelatinous waste material and this gas we found was migrating through the landfill and escaping through the surfaces. The gas is being now collected through a series of approximately 60 gas wells, which extract the gas from the ground and direct the gas to a flare where it is destroyed by burning.

Mr. **Skelton**. We did have the benefit of seeing that particular destructive process this morning.

What other gases, if any, did you discover, Mr. Camarena?

Mr. **Camarena**. We have measured a number of other gases. The list is quite lengthy. In the study that was conducted in July through October 1982 in cooperation with the State agencies, we measured other commonly used materials in industry, which wind up at a disposal site such as this. They include perchloroethylene, which is used as a solvent cleaning fluid in dry cleaners; trichloroethylene, which has been used in the past as a degreasing solvent——

Mr. **Skelton**. Let me interrupt you now. You discovered a series of different gases. Is that not correct?

Mr. **Camarena**. That is correct.

Mr. **Skelton**. Are all of them being disposed of or just the vinyl chloride?

Mr. **Camarena**. The gas collection and incineration system does not discriminate amongst the various compounds. It burns them all with relatively equal efficiency.

Mr. **Skelton**. I noted at least in my opinion, an apparent conflict in your comments earlier, sir. There was an excess cancer risk factor, but then immediately below that was a line saying you expected no additional cancer incidence. Would you tell us, am I incorrect when I say that is in conflict?

Mr. **Camarena**. I believe so. This was the finding of the analysis of the California Department of Health Services epidemiologists. They concluded, based on the data that was generated in this test that there indeed was a slight excess risk from the exposure over a long period of time to those levels that we found in the summer of 1982.

That risk was calculated as 5 in 100,000. This is a small number.

Mr. **Skelton**. If you are one of those five, it is not a small number. [Applause.]

Mr. **Camarena**. I would agree with you. Based on the number of people living in the area where these levels were found, the State Department of Health Services further concluded that they would expect no additional cases of cancer due to the exposure to date. That is a probability statistic type analysis done by the epidemiologists of the Department of Health Services, not by the Air Quality Management District.

Mr. **Skelton**. Mr. Camarena, I am just from a small town in Missouri. That still seems in conflict to me. I don't wish to pursue it further.

I do wish to ask Mr. Steele some questions. Tell us about the closing off the street. What is it? Azusa? Is that the way you pronounce it?

Mr. **Steele**. Yes.

Mr. **Skelton**. Tell us about that.

Mr. Steele. Well, when an incident occurs, the spill along Azuza Avenue——

Mr. Skelton. Tell us how a spill occurs.

Mr. Steele. Typically, occurrences in the past——

Mr. Skelton. You see, I come from pickup truck country. I don't have these big tank trucks going up and down Lexington, Mo.

Mr. Steele. Well, typically what happens is one of these tank trucks on Azuza Avenue comes up to one of the stoplights and the light begins to turn and the truck operator hits the breaks and if all of the fittings on the truck are not properly secured, the result can be a sloshing out of material onto the street through one of the vents or drain connections on the tanker. That has occurred on a number of occasions.

Mr. Skelton. How often does that occur, Mr. Steele? Do you have an incident record on that?

Mr. Steele. I do not personally have such a record.

Mr. Skelton. Who has? Who could tell us that?

Mr. Steele. I think the city of West Covina Police Department certainly would have that information.

Mr. Skelton. If the city fathers will take note of that, I will ask that question a bit later. Do you close off the entire Azuza Avenue? That is a long street.

Mr. Steele. Well, we close the area in which the spill occurs and that may result in Azuza Avenue being backed up with traffic for some considerable length.

Mr. Skelton. Well, hours, minutes, or days? How long, sir?

Mr. Steele. There have been occasions where it has been as long as 8 hours; yes.

Mr. Skelton. So, what happens to life along that pathway when it is closed down?

Mr. Steele. It is considerably inconvenienced.

Mr. Skelton. What happens to the businesses in that area when it is closed down?

Mr. Steele. I would imagine that they sustain a very negative business impact during that period.

Mr. Skelton. What happens to the residents that live in that area during the time it is closed down?

Mr. Steele. They are equally inconvenienced.

Mr. Skelton. What about the schoolchildren in that area during that time?

Mr. Steele. They may well be inconvenienced, too.

Mr. Skelton. You mentioned something about evacuation, Mr. Steele. Would you tell us, is it a fact that some of these areas must be evacuated from time to time?

Mr. Steele. We have not felt the need to evacuate major areas. We have asked law enforcement agencies, either the sheriff or the West Covina Police Department on specific spills, depending on the nature of the substance spilled to keep people away from the immediate area of the substance that was there on the street.

Mr. Skelton. For how long a period of time?

Mr. Steele. Until such time as it could be cleaned up.

Mr. Skelton. Hours, minutes, or days?

Mr. **Steele**. As long as 8 hours on occasion. I would like to, if I may, describe that scenario which can result in such an 8-hour shutdown.

Mr. **Skelton**. Would you please?

Mr. **Steele**. My department operates a hazardous waste control program, which is engaged in the normal course of events in inspecting the some 18,000 hazardous waste generators in Los Angeles County who are licensed by my department as an acknowledgment that they, in fact, are generating and handling hazardous wastes. When a spill occurs on Azusa Avenue or elsewhere in the county, staff from that organization will respond, either from their downtown headquarters location or from wherever they may be in the field conducting their inspections.

It can take as long as an hour for staff from my organization to arrive on scene.

Mr. **Skelton**. So, what happens during that hour?

Mr. **Steele**. During that time, typically, the police or fire agency that has immediately responded from the local area here and arrives on the scene very quickly and barricades off——

Mr. **Skelton**. Just shuts down traffic.

Mr. **Steele**. They shut it down. That is correct and call us and we respond as quickly as we can get here to try to identify just what that substance may be and try to identify a responsible party who will pay for the cost of the cleanup.

Mr. **Skelton**. Then what happens?

Mr. **Steele**. Then we call either Crosby & Overton or IT Corp. to respond and conduct a cleanup. Those organizations come from as far away as Wilmington and it can take them at least another hour to arrive on the scene. They also typically are concerned about the solvency of the organization that has acknowledged responsibility for the spill and so they run a credit check before they will roll.

Mr. **Skelton**. Now, wait a minute. Would you repeat that? I am not sure I understood that. You run a credit check before you let the thing go again?

Mr. **Steele**. No, sir. I said the corporations involved in the cleanup run the credit check. That is IT Corp. or Crosby & Overton.

Mr. **Skelton**. Does this hold up the process?

Mr. **Steele**. It can hold up the process a bit.

Mr. **Skelton**. You mean, you have all this traffic stacked up out there and you are waiting to run a credit check before you clean up the spill?

Mr. **Steele**. Yes, sir.

Mr. **Skelton**. You have got to be kidding.

Mr. **Steele**. No, I am not kidding.

Mr. **Skelton**. Have you ever come up with a bad credit rating? What do you do then?

Mr. **Steele**. In such cases the county agrees to foot the cost of the cleanup.

Mr. **Skelton**. How much extra time does it take, No. 1, to have the credit check and, No. 2, if they turn up with a bad credit rating?

Mr. **Steele**. Well, I don't think it takes a great deal of time for them to run a credit check, but it has led to confusion in previous incidents. What I am trying to describe for you is a process that was in place and we are trying to modify now.

Mr. **Skelton**. But that is still in place at the present time?

Mr. **Steele**. We are working to get——

Mr. **Skelton**. Answer my question. Is it still in place at the present time?

Mr. **Steele**. Yes, sir. It is.

Mr. **Skelton**. When did you decide to change the system and do away with the time-consuming credit check?

Mr. **Steele**. Well, we have decided to change the system and we will do away with several steps in the process. What we are in the process of obtaining is a purchase order through the county purchasing system, blanket purchase order, with those two cleanup firms. What that will enable us to do is as soon as we get to the scene and identify that a spill has occurred is to call one or the other of those firms and order them on our purchase order to roll to the scene.

We will then undertake the responsibility for identifying the responsible party and attempting to obtain reimbursement for the cost of that cleanup after the fact of the cleanup, rather than before it.

Mr. **Skelton**. Mr. Steele, how long has this procedure that you presently have been in operation?

Mr. **Steele**. About 6 or 8 months, sir.

Mr. **Skelton**. Proceed with your description of what happens.

Mr. **Steele**. Well, that is basically it. At the present time, once the firm is called and has identified the fact that there is a responsible firm that acknowledges responsibility for the cost of the cleanup, they roll to the scene. Again, it may take them an hour to arrive here, depending on where they are working in the county at the time and proceed forthwith to take the necessary steps to clean up the situation. Then the roadway can be reopened.

A second alternative that is also being discussed at the present time with the BKK Corp. is a development by them of a capability right here at the landfill to handle these kinds of spills as they occur along Azusa Avenue. They could roll right down the hill and immediately begin to work on the problem. That is going to necessitate acquisition of additional equipment and a training of manpower in the handling of those spills, but we are hopeful that that can also be accomplished within the next month or two.

Mr. **Skelton**. Now, what happens to the businesses in that area of your particular spill or closure during all this time, Mr. Steele?

Mr. **Steele**. Well, I would suspect they are considerably inconvenienced and negatively impacted from a financial point of view.

Mr. **Skelton**. Which means customers don't go to them. Is that correct?

Mr. **Steele**. Customers are unable to come to those stores during that timeframe.

Mr. **Skelton**. Have you received complaints from businesses as a result of these closures?

Mr. **Steele**. Well, we have received some and I know that the city of West Covina has received many more.

Mr. **Skelton**. Counsel.

Mr. **Orban**. I have no further questions.

Mr. **Skelton**. Dr. Simpson.

Dr. **Simpson**. I have a few questions to ask of Mr. Harris. You described an analysis of water from the BKK, which was tested for chemical content. Was the water that was tested drawn from a large pond?

Mr. **Harris**. We tested water from wells downstream of the barrier and wells further downstream, ground water, producing wells, downstream in the basin, not from a pond, but from wells.

Dr. **Simpson**. Have you ever tested water from their large collection pond?

Mr. **Harris**. No, I don't believe so.

Dr. **Simpson**. Have you ever tested water from their refilling tanks, which are used to refill their road-watering trucks?

Mr. **Harris**. No. We are not interested in that because it is on the landfill rather than off the landfill.

Dr. **Simpson**. Can you provide details of the study that you talked about?

Mr. **Harris**. I can submit them to you subsequently. I don't have them with me.

Dr. **Simpson**. OK. For Messrs. Camarena or Sylte, I have a few questions. Am I correct, in April, in Berkeley there was a public meeting by the ARB to look into toxic air pollutants? Is that correct?

Mr. **Sylte**. Yes, it is.

Dr. **Simpson**. Can you describe what movements are currently afoot to regulate other hazardous air pollutants beyond vinyl chloride?

Mr. **Sylte**. Yes. There is a process just getting started in the State of California. We are just getting off the ground with an airborne toxics-control program. There are two basic phases to it. The first is to set up a means of identifying substances as toxic air contaminants, formally designating them as such. The process will be aided by a science panel which will review the health evidence on various substances.

The science panel will advise the Air Resources Board who will, at a public hearing, make a decision as to whether a substance is to be regarded as a toxic air pollutant.

After designation, phase two will use the conventional partnership that we have with the local districts to proceed to control these pollutants. Most designated substances will be controlled through traditional permits and regulations at the local level by local air districts.

Dr. **Simpson**. What sorts of substances are you thinking about?

Mr. **Sylte**. We have a study list of 45 or 50 substances that over the years we have identified as either having been measured in the ambient air or we know are being emitted to the ambient air in various areas of the State, but we have not selected any specific compounds at this time.

Dr. **Simpson**. Have any of these 45 or 50 been found around BKK?

Mr. **Sylte**. Yes. In fact, the substances that we monitored in the neighborhood are substances that are on that list.

Dr. **Simpson**. Are there any plans so far as to what sort of regulation might come about?

Mr. **Sylte**. No, there are not.

Dr. **Simpson**. OK. So, you probably wouldn't be able to say what effects on BKK could come about from the regulation?

Mr. **Sylte**. No. In fact, they haven't been identified as toxic air contaminants by the State yet.

Dr. **Simpson**. OK. Would you be able to provide that list of 45 or 50?

Mr. **Sylte**. Yes, I will be glad to.

Dr. **Simpson**. Fine. Thank you.

Mr. **Skelton**. Mr. Harris, you said you were not interested in the water because it was on the landfill?

Mr. **Harris**. That is correct. As far as we are concerned, it is a class I landfill and can take anything.

Mr. **Skelton**. But you are not concerned about the use of that water that came from the landfill as a rain runoff and then is sprayed on by the spray trucks. You are not concerned about that at all?

Mr. **Harris**. No, sir.

Mr. **Skelton**. Well, first, in your opinion, this water that you are not interested in, is it contaminated?

Mr. **Harris**. I would not expect the rainfall runoff to be particularly——

Mr. **Skelton**. Even though it drains down through the landfill?

Mr. **Harris**. If it goes through the landfill, I wouldn't call it rainfall runoff. I would call it leachate, but rainfall runoff, the surface water——

Mr. **Skelton**. Well, there is a big pond down there that collects a lot of water. Is that not correct?

Mr. **Harris**. Yes.

Mr. **Skelton**. I am sure some of it is rainfall and some of it is leachate. Is that what we call it?

Mr. **Harris**. Leachate.

Mr. **Skelton**. It contains both. Is that correct?

Mr. **Harris**. I believe so, sir.

Mr. **Skelton**. Is it not a fact then that the water in that little pond down there is contaminated?

Mr. **Harris**. I wouldn't doubt it contains some——

Mr. **Skelton**. All right. So, you agree that it would be contaminated. That same water, is that not used to fill the tanks and spray and to clean out the trucks from time to time? Is that not correct?

Mr. **Harris**. Yes.

Mr. **Skelton**. To spray the roads?

Mr. **Harris**. Within the landfill.

Mr. **Skelton**. You don't think this could have any harmful effects by being picked up in the air or tires driving over it and carrying contamination away with it?

Mr. **Harris**. No, I don't think so. As long as it is in a class I area, I don't think so.

Mr. **Skelton**. I see. Counselor has a question.

Mr. **Orban**. Now, Mr. Harris, as I understand it—correct me if I am wrong—the California Regional Water Quality Control Board performed geological studies, which made the determination that BKK landfill was a suitable landfill for hazardous wastes. Is that correct?

Mr. **Harris**. We had those studies performed for us by the California Department of Water Resources. We had no geologist or at that time had no other access to a geologist.

Mr. **Orban**. The authority is yours, though?

Mr. **Harris**. Yes.

Mr. **Orban**. OK. Based on the determinations made by the groups that you hired to perform those studies, you have concluded that the area underneath the landfill, the liner of the landfill, if you will, is nonpermeable, is one that, at least for the time being and for the foreseeable future, won't crack, cause a problem such as the problems we have had at other landfills close by that which tend to crack when they thought they had a liner?

Mr. **Harris**. Yes, we are satisfied that the basement complex or the bedrock is solid and not going to leak. We did have two barriers caused to be constructed in some canyons and these are impervious barriers.

Mr. **Orban**. Have those barriers ever leaked in the past?

Mr. **Harris**. No, not to my knowledge. We monitor those by wells downstream.

Mr. **Orban**. OK. Thank you very much.

Mr. **Skelton**. We are doing well on time and I compliment the gentlemen on this panel. Unless you have any further comments you wish to volunteer, that will close this panel.

I might announce we will have a short recess and then we will reconvene with the independent analysts from UCLA and Stanford. Thank you so much.

[A brief recess was taken.]

Mr. **Skelton**. Our hearing will resume.

Next on our list, and I might say we are doing well on time, we have independent analysts, Professor Richard Perrine from UCLA, and Douglas MacKay, from Stanford University.

Gentlemen, I thank you for coming and I welcome you and I will ask Professor Perrine to please begin. We will hear from both of you gentlemen before we proceed with the questions.

PANEL CONSISTING OF DR. RICHARD L. PERRINE; AND DR. DOUGLAS M. MacKAY

TESTIMONY OF DR. RICHARD PERRINE, UNIVERSITY OF CALIFORNIA AT LOS ANGELES

Mr. **Perrine**. Chairman Skelton, Congressman Torres, ladies and gentlemen, it is a privilege to be here this morning with you and I certainly will try to provide what independent input I can to your hearing process. I can assure you, those who know me and my work as an occasional adviser to public agencies know that I am very independent. I have worked with our local air quality management district on the advisory council, with the State Air Resources Board on the research screening committee in the past, and even sometimes in the past I have been privileged to serve as a panel chair and participant on panels for your Office of Technology Assessment of the Congress.

The BKK sanitary landfill in West Covina has met a need for disposal of wastes over an extended period, but certainly not without controversy. My remarks will be intended to assist your organization, your Small Business Subcommittee on Energy, Environment and Safety in focusing on some particular aspects of siting and operation.

Rather than attempting to cover all of these, I am going to focus on three particular topics: First of all, emissions to the air environment, the transportation of waste and siting of such facilities and how to resolve concerns.

Mr. SKELTON. In what? I am sorry.

Mr. PERRINE. In siting of such facilities and how to resolve concerns.

On emissions to the air environment, a specific and potentially important concern is this release of vinyl chloride and related volatile, hazardous organic materials to the ambient air. The data clearly indicate that the BKK landfill represents a significant source of this potential carcinogen, as periodically the California ambient air quality standard has been exceeded. Reports which I am sure are in your files document this, developed by California State and local agencies.

However, if you look honestly at what has happened, once the presence of these organic compounds was identified, the actions by State and local agencies to monitor and control them have, in my judgment, been relatively prompt and professionally thorough.

I think we are fortunate that the ambient levels we observe are low enough so that probably there is no great real danger. In this instance I would like to point out, and this will add perhaps to the testimony received just a short while ago, that the approach by the California Department of Health Services to estimate risk to the public is very conservative. What they have actually done is not really a risk assessment. If you look at a risk management framework, you can ask the question: What would it take to provide a really thorough risk assessment as a guide to policy for a facility such as BKK?

This requires several steps: First, hazard evaluation. Does the agent you see around cause the adverse effect? I think that is now documented. The second step is risk assessment. This includes several elements. Dose response assessment, which is health sciences. It is not my kind of an area, but people do know how to do those things.

A second element is exposure assessment. What about the transport, the conversion processes which affect the kinds of chemicals you see? The removal processes add exposure then to people in the neighborhood.

The third item is risk characterization. What kind of adverse effect can you then expect on a given population?

Then the third overall problem is development of options. You have to compare the costs, the risks, the benefits for all populations, incorporating uncertainty, because you don't really know exactly what is going to happen.

When I say all populations, suppose you decided to remove all of the material from this site and put it somewhere else? What does that do to other populations along the way as it is being transported and placed in another site?

Finally you come down to policy management analysis, which requires scientific evaluation, political judgment and a share of societal concern. Then finally you actually do risk management; you execute decisions. This is a very long, involved process.

A key difficulty in accomplishing this series of steps is the need for very extensive field monitoring and data collection, which has just been started in a relatively recent period in this case.

We need very much improved dose response data before you can really say what is going to help the health of people. There is a very complex exposure assessment effort that is required, which is essentially modeling—using mathematical tools, for example—to see, given a hypothetical source, what may happen to people.

The overall result is that this cannot be done quickly or easily. It requires a very major effort, and the reduction in uncertainty that you get to make final political judgments as to what should be accomplished may be very, very modest indeed. You have to understand that you do a heck of a lot of sophisticated technical work to improve the basis of your decisions by a modest amount.

The Department of Health Services risk assessment which has been made is what I would call oversimplified and semiqualitative. On the other hand, it is very conservative. What they have done is to overpredict the risk to nearby population by factors which might well reach a factor of 100. The reason that this happened is——

Mr. SKELTON. Wait a minute. Say that in English.

Mr. PERRINE. They take data which they observe from monitoring sites and they see the level, for example, of vinyl chloride at a particular time and place. Then they make simplistic calculations, assuming that, for example, the people who will be exposed will be exposed for 24 hours a day, which is really not true for a typical person. They assume that there will be movement of the air without the normal dispersion processes that occur and so you assume, again, that the pollutant is more concentrated than it really is.

So, in effect, if you look over a person's lifetime of exposure to this, you may find that the assessments that are made in this case are what we call when doing air quality control analysis "worst case assumptions". That is a right way to do the analysis. It tells you first of all whether there is a problem. If you do worst case assumptions and there is no apparent problem, you can say "forget it". If you do find a problem, then you can proceed to hone in and refine your data.

But in this present case the methods used are very crude in the sense of being quite conservative; and I think that is a proper way to do. So, it means that some individuals may actually receive the kind of risk you are talking about, but probably, and fortunately I would say, only a small portion of the population.

We do have to put these things in perspective and in that sense I would like to point out that benzene is another organic chemical which is ubiquitous in our petrochemical-based society.

It constitutes perhaps 1 percent of the gasoline you use in your automobile. It is not only toxic, but a recognized human carcinogen causing leukemia. What steps do each of us as individuals take when we go up to a self-service pump and fill our cars with gasoline to avoid spillage or evaporation of this potentially carcinogenic material into the air environment? Quite frankly, I think, a lot of us impose risks on ourselves which we don't often recognize and in society we have to live with these things.

Returning to the BKK situation, I really do believe that there are methods to solve this kind of a problem. I handed a copy in earlier, and I have another copy for your files here of a very recent article which I think is very important. It comes from a journal published by the American Institute of Chemical Engineers: "Environmental Progress," and the title, is "Resource Recovery—A Byproduct of Hazardous Waste Incineration." The key fact here is, as the author of this article points out correctly, that for the prior 10 years there has been technology to take these kinds of very hazardous materials, convert them to useful energy and to useful byproducts—commercial grade hydrochloric acid—and not only is it a good thing to do in the sense of the environment, but it can be very profitable.

For this particular case—not my case but one published by a competent professional—it turns out that the after-tax internal rate of return on investment for this kind of a process is calculated as greater than 70 percent. Wouldn't you like to make that kind of an investment and get that kind of return on your money?

It turns out then that I believe that recycling of many of these materials is fully possible. It has not been developed in our society as it should have been. We should do those kinds of things routinely.

By the way, this provides a marvelous opportunity for small businesses. It presents a good opportunity to improve the economy of the country at the same time.

Now, focusing on transportation of waste. Transportation is a highly competitive business. Unfortunately, on the regulatory side, it is quite messed up. There are all kinds of agencies that naturally get involved in the system. As a consequence you find that there are breakdowns. There are accidents that occur. There are going to be these kinds of events. We are dealing with humans and human failure.

I honestly believe that just as you can recycle material, in cases where that is difficult, it is still possible to convert the material to an essentially innocuous form, or at least a much less hazardous form before you transport it. I think there is need for pressure to take this kind of step before you just toss materials out in the environment.

Then finally, focusing on siting, hindsight permits us to say—by my judgment—with assurance, that facilities such as the BKK landfill and residential and commercial development never should have been permitted this near to each other. Some release of odors and organic gases and some added noise and other risk is inevitable.

All of the studies that we know, for example, about the movement of gas through a facility like this and its potential recovery tell you you are never going to get it all. You always will have volatiles released. We do need to do a better job on control of gas releases, but realistically the best thing is to avoid the problem in the first place.

I would recommend imposing such things as a mandatory requirement that in the siting of a facility such as this, the developer of the facility be required to essentially buy out development rights for adjoining properties so there is no pressure to develop that property and build up the kinds of problems that you now have.

In summary then, I would like to conclude by giving five specific suggestions that merit consideration:

One, we should eliminate or substantially reduce landfill disposal of hazardous wastes through recycling or conversion to innocuous forms.

Two, we should eliminate or substantially reduce the need for transportation of waste materials while they remain hazardous.

Three, essential disposal facilities should be sited with the separation needed to protect other activity in centers of population and business.

Four, we should continue careful monitoring—in fact, improve monitoring—of presently used sites, particularly those we now wish were located elsewhere.

Five, vigorous steps should be taken to facilitate development of knowledge which will permit recycling and conversion of more kinds of wastes, and hence reduction of societal concern.

This is a genuine opportunity. You might ask the question: "Why doesn't it happen when you can calculate that you can make a good return on investment." Remember: The small businessperson going out into the real world sees a tremendous uncertainty and a tremendous risk. As an individual, he is not prepared to take that risk even if the calculations come out very optimistic; so it doesn't happen.

We need something to facilitate innovation; to encourage, to provide a driving force. Then I think it can happen.

Thank you.

[Dr. Perrine's prepared statement follows:]

PREPARED STATEMENT OF DR. RICHARD PERRINE, UNIVERSITY OF CALIFORNIA AT LOS ANGELES

The BKK Sanitary Landfill in West Covina has met a need for disposal of wastes over an extended period, but not without controversy. My remarks will be intended to assist the House Small Business Subcommittee on Energy, Environment and Safety in focusing on those aspects of the siting and operation of such facilities as are of special concern because of their effects on neighborhoods and small businesses. Rather than attempting to cover all concerns, attention will focus on emissions to the air environment, the transportation of wastes, and siting to resolve concerns.

EMISSIONS TO THE AIR ENVIRONMENT

A specific and potentially important concern is the release of vinyl chloride (and related volatile, hazardous organics) to ambient air. The data clearly indicate that the BKK Landfill represents a significant source of this potential carcinogen, as periodically the California ambient air standard (0.01 ppm) has been exceeded (see "Ambient Air Monitoring and Health Risk Assessment for Suspect Human Carcinogens Around the BKK Landfill in West Covina," Calif. DHS, Calif. ARB, and South Coast AQMD, March 1983). Thus past BKK operation represents an example of landfill disposal of materials which should have been handled by other means. Once the presence of these organic compounds was recognized, however, actions by state and local agencies to monitor and control them have, in my judgment, been prompt and professionally thorough.

Fortunately, ambient levels are low enough so that there probably is no great real danger. In this instance the approach by the California Department of Health Services to estimate risk to the public is very conservative. Thus there is every reason to believe that the real added health risk from BKK's past acceptance of volatile hazardous materials is being reduced to levels hard to distinguish from many other irritants of modern life. However, this does not make the nuisance value or perceived risk from the landfill any less of a corn to neighbors; both individuals and businesses.

The best way to avoid problems such as the release of chlorinated organics to the atmosphere is resource recovery in place of landfill disposal. This is an approach which has received vigorous support over the last several years by agencies of California state government, and still has a great deal of momentum carrying it forward. The idea of converting potentially harmful waste to valuable resources is not just a Sierra Club dream. "Resource Recovery—A Byproduct of Hazardous Waste Incineration" is a recent article authored by James J. Santoleri in a peer-reviewed publication of the American Institute of Chemical Engineers (Environmental Progress 1 (4): 268–273, November 1982). This article provides technical design and economic data for the recovery of energy and commercial grade hydrochloric acid from chlorinated organic wastes; vinyl chloride is the specific example. Results of routine engineering economic analysis provide insight into the worth of this environmentally preferred disposal alternative. Using Accelerated Cost Recovery and data from the Santoleri article leads to an estimated after tax internal rate of return on investment greater than 70 percent; a very profitable investment. It indicates that with proper engineering design, favorable economics and good environmental management can go hand in hand.

One might well ask why, when some such knowledge has been available for a decade or more, landfill disposal of potentially useful materials has continued to take place. Only a judgmental response can be made. To recycle wastes effectively, even if profitable, requires a quite substantial investment of technical and management skills and in each instance addresses only a moderate sized profit target. There too often appear to be other uses for these talents; more in the mainstream of a business activity, less challenging, and hence perceived as more assured profit opportunities. The end result is that we have done less than the best.

TRANSPORTATION OF WASTE

Incidents of accidential release of hazardous materials during transportation of wastes are not an everyday occurrence, but have become too common. Incidents near BKK appear to have substantially raised the concern level of some of its neighbors.

While transportation of hazardous wastes appears highly regulated, there are opportunities both for overlapping jurisdiction and for gaps, where no one may really be in charge. The transportation business can be highly competitive leading to efforts everywhere to cut costs. One obvious result is that too many heavy commercial vehicles—including those carrying hazardous materials to disposal—are not as well maintained and operated as would seem rational. We see breakdowns and accidents which appear to be a result of placing cost-competitiveness ahead of risk-mitigation. An accompaniment is the transfer of an extra large share of real costs from waste generators to those who live and work near or along the route to disposal sites.

While the regulatory structure underlying hazardous waste generation no doubt can be improved, many opportunities for failure will remain. The best bet would appear to be to reduce the need for transportation of materials while they are still hazardous. Where recycling is not effective, the effort still should be made to convert wastes to a low hazard or hazard-free condition prior to their movement. Volume of the more hazardous materials can be reduced, and special handling of the remnants can essentially eliminate any residual risk. A primary gain will be to internalize costs; to assess costs against those responsible for them.

SITING

Hindsight permits us to say with assurance that the BKK Landfill and residential and commerical development should not have been permitted so near to each other. Some release of odors and organic gases, some added noise, and thus some added concern for both real and apparent risks seems inevitable.

The studies made the documented steps taken by local and state governmental agencies clearly have substantially reduced the problems from what they might have been. However, no gas recovery system for a landfill will ever catch all volatiles released, any more then we can recover the last drop of oil from a petroleum reservoir.

Realistic decision-making thus suggests that a best overall result may be obtained when those truly essential hazardous waste facilities are initially sited and maintained apart from populated centers. However, to achieve this will require a strong-willed as well as highly professional planning authority, more characteristic of European democratic societies than the U.S. For example, the developer of a disposal facility could be required to pay for loss of future development rights that must be taken from adjoining property to avoid use conflict in sensitive areas. To date our society has been hesitant to face up to such realities.

SUMMARY

Five specific suggestions merit consideration as a means to reduce the concerns felt by neighbors of hazardous waste disposal sites, such as BKK.

1. We should eliminate or substantially reduce landfill disposal of hazardous wastes through recycling or conversion to an innocuous form.
2. We should eliminate or substantially reduce need for transportation of waste materials while they remain hazardous.
3. Essential disposal facilities should be sited with the separation needed to protect other activity in centers of population and business.
4. We should continue careful monitoring of presently used sites, particularly those we now wish were located elsewhere.
5. Vigorous steps should be taken to facilitate development of knowledge which will permit recycling and conversion of more kinds of wastes, and hence reduction of societal concern.

Both public and private agencies should work together in pursuit of these goals. However, the nature of the problem is such that progress is likely to be quite slow unless there is federal government involvement as a strong driving force. At the same time, small business organizations could grow to provide the best source of technical knowledge and management to solve waste recycling/conversion problems. If this can be facilitated, large elements of our society will benefit.

Mr. SKELTON. Doctor, thank you very much. We will explore that area a bit later with you. I appreciate your raising it.

Dr. MacKay.

TESTIMONY OF DR. DOUGLAS MacKAY, RESEARCH ASSOCIATE, ENVIRONMENTAL ENGINEERING AND SCIENCE, DEPARTMENT OF CIVIL ENGINEERING, STANFORD UNIVERSITY

Dr. MACKAY. I appreciate the opportunity to give these comments today. Let me just tell you who I am. I am a research associate at Stanford University in the Department of Civil Engineering. At the moment I am managing an interdisciplinary research project on ground water contamination from hazardous waste disposal. We have a number of faculty and research associates and graduate students working on this project. We are interested in every level of the problem in a sense from a research standpoint. We do laboratory work, field work, and theoretical work. However, what I would like to emphasize today is that my comments, because I am not an expert on the BKK landfill itself, should be considered more general.

To begin with, I should point out that I was asked to talk about ground water contamination potential, so I think there are essentially two questions. The first one is can the waste leave the site, the boundaries, via the ground water and then does this pose some sort of an immediate or long term environmental or health problem?

The second question is extremely difficult to answer and I am not going to do that because I am not prepared to or qualified, but we can talk a bit about whether the waste might be able, at least conceivably, to escape the site. That is also a difficult question, but I am better prepared to talk about that.

To review just for a second, the site itself is located in an area that is consistently referred to as over bedrock composed of shale, siltstones and sandstones. In the various documents that I have read it is referred to as an essentially impermeable material and that, generally speaking, would be considered true, that the bedrock itself, that is not weathered or fractured, has an extremely low permeability to transport water through it.

Mr. SKELTON. Doctor, may I interrupt you right there? Are you acquainted with any geological faults that I have heard about in this area? Are you intending to address those?

Dr. MACKAY. I won't address faults per se, but I think the gist of your question I will get to in just a second.

Mr. SKELTON. Fine. Thank you.

Dr. MACKAY. I just want to point out that the issue is certainly not the bedrock itself, because water transport through such materials would be on the order of inches per century and we wouldn't need to worry about that underneath a hazardous waste site.

However, it is mentioned in these various documents that the bedrock material, especially close to the surface, is highly fractured and it is overlain by soils. What exactly causes this fracturing is certain to be a number of factors, including seismic activity. I don't know specifically——

Mr. SKELTON. In Missouri, I think we call them earthquakes.

Dr. MACKAY. Earthquakes, yes, sir.

Mr. TORRES. Mr. Chairman, if the gentleman will yield for a minute?

Mr. SKELTON. Yes.

Mr. TORRES. Are we also talking about fissures? Is this in the same category of fractures?

Dr. MACKAY. I would say so, yes.

Mr. TORRES. You would say so?

Dr. MACKAY. Yes. If what you mean by a fissure is some sort of a crack in the bedrock.

Mr. TORRES. Yes.

Dr. MACKAY. The documents that I have seen suggest that at least the upper 30 feet or so of the bedrock is highly fractured and that some fractures may extend to perhaps 60 feet below the ground surface.

So, I think the crucial issue with respect to ground water contamination from the site is not vertical migration down to some unknown source of water below the site, but horizontal migration from the site via this fractured zone.

The facility has made extensive efforts to preclude that migration and the questions that arise essentially are, have those measures done their job. Is it possible to fully understand the extent of fracturing? Is it possible to seal those fractures once they are understood and, perhaps even more importantly, are the monitoring systems that BKK has in place actually measuring the locations through which the contaminants are most likely to migrate?

The reason I say that is if you can imagine in a sense you may have soils overlaying a fractured zone overlaying a less fractured zone. It is extremely difficult to take water samples from fractured materials. This is an area where considerable research is underway simply to figure out how to design a well to take a sample which means anything and one would want to ask related to the monitoring results, are these samples taken in a point which are representative. Would they actually detect migration if it were occurring through some sort of a fractured zone?

The reason it is important, and I mentioned this in my longer comments, when I mentioned that through bedrock itself one might think that ground water would move only inches per century, it could move considerably faster, and this stands to reason, through fractured materials.

Some sample calculations that I made in my written testimony would suggest that one wouldn't be surprised by velocities on the order of 1 to perhaps 1,000 feet per year for ground water moving through very small fractures. Those kinds of estimates are borne out by actual measurement of researchers, not at Stanford, but elsewhere, who measure velocities through fractured material.

So, the point is that if the contaminants were to get to fractures, they could conceivably move rapidly and one would simply want to know whether the containment structures that are in place could be expected to prevent that.

Then one final point and that is assuming the containment structures can prevent it, at least at the present time, because such facilities are closed at one point or another, the other question that arises is will these containment systems survive over time, whatever time period is appropriate for the facility in question and since BKK receives a wide variety of hazardous material, many of which are not necessarily known to be biodegradable at the moment or in any other way degradable, it is conceivable that such containment structures might have to last for extremely long periods of time.

That really concludes my formal comments.

[Dr. MacKay's prepared statement and additional submission follow:]

PREPARED STATEMENT OF DR. DOUGLAS MACKAY, RESEARCH ASSOCIATE, ENVIRONMENTAL ENGINEERING AND SCIENCE, DEPARTMENT OF CIVIL ENGINEERING, STANFORD UNIVERSITY

I have been asked by the subcommittee to comment on the potential for groundwater contamination from the BKK landfill. I must emphasize that, as requested, my comments will address general areas of concern. I am not an expert on the BKK landfill itself, and thus have taken the following approach in preparing these comments. In the limited time available I have attempted to learn as much as possible about the landfill and the characteristics of its site from the written information provided to me by the Subcommittee, from other written sources already in my possession, and from conversations with various State officials. As the time was short, the information with which I had to work was somewhat spotty. Nevertheless, enough was available to construct a general understanding of the potential areas of concern, given what has been observed at other land disposal sites and reported in the literature. With this understanding and after consultation with other specialists within the academic world, I offer the following comments. Combined with and perhaps revised by the testimony of parties directly knowledgeable about the BKK landfill, these comments will hopefully lead to a clear understanding of the issues facing the Subcommittee.

In general, groundwater contamination from land disposal of hazardous wastes can occur by a number of different routes. To outline the routes and assess their importance in this case, it is necessary to understand the hydrologic and geologic characteristics of the disposal site as well as the details of the operation on the disposal facility. From the limited amount of information available to me during the preparation of these comments, it appears that the site can be schematically represented as shown in Figure 1. This figure is included only to clarify the discussion and aid in defining the crucial questions; it is by no means an accurate description of the site itself.

The site is in a box canyon, roughly oriented east-west, with the canyon opening at the west. The landfill site includes 583 acres, only 140 acres of which are designated by the State for disposal of hazardous wastes. The information available to me did not describe the location of the Class I subarea (the 140 acre parcel) nor the reasons that specific

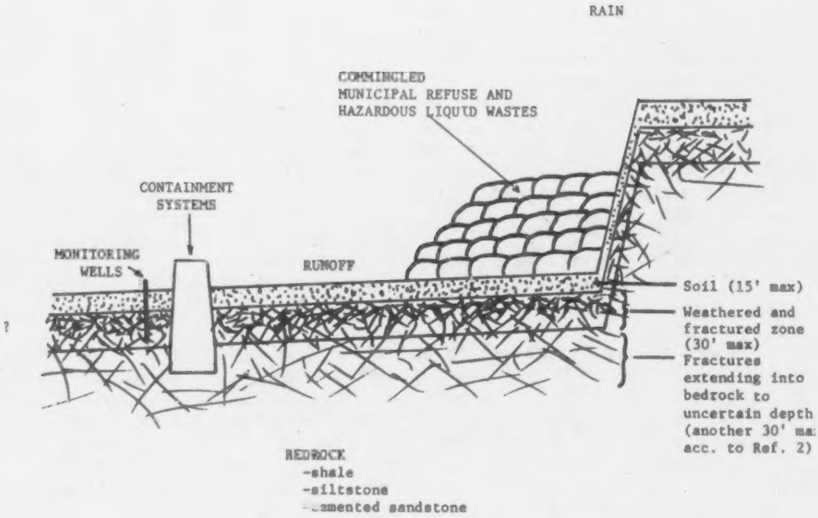

RAIN
COMMINGLED
MUNICIPAL REFUSE AND
HAZARDOUS LIQUID WASTES
CONTAINMENT
SYSTEMS
MONITORING
WELLS
RUNOFF
?
Soil (15' max)
Weathered and
fractured zone
(30' max)
Fractures
extending into
bedrock to
uncertain depth
(another 30' ma:
acc. to Ref. 2)
BEDROCK
-shale
-siltstone
-cemented sandstone

Figure 1. Schematic representation of the possible routes of contaminated liquid escape to subsurface water at the BKK landfill. Whether these routes are actually present or important at the landfill site is not certain. The green arrows illustrate the various conceivable routes.

The crucial question with respect to the potential for offsite groundwater contamination from the landfill appears to be whether fracturing within the bedrock extends below the various containment systems and allows leachate to escape, perhaps even undetected if the monitoring well system does not extend deep enough or is too widely spaced to detect contaminant migration between the wells.

subarea qualified for Class I designation. The Subcommittee should pursue these points, especially the second. There may well be particular characteristics of the Class I site that are not reflected in Fig. 1 or the following comments, both of which were based on description of the area in general.

The bedrock in the area is consistently referred to as shales, siltstones and cemented sandstones in various descriptions of the site (e.g., References 1 and 2). The unfractured, unweathered bedrock was estimated to have a hydraulic conductivity somewhat below 10^{-8} cm/sec. This value is consistent with general values for such materials reported in Freeze and Cherry's textbook Groundwater (Prentice-Hall, 1979) and such media would be described as "impermeable" from a practical point of view. Such low hydraulic conductivities theoretically restrict the rate of flow of water through the solid bedrock to a few inches per century. This also explains why the bedrock is referred to as non water-bearing and why there are no known aquifers (water-bearing subsurface zones) beneath the weathered or fractured surface material at the site.

It is noted in Ref. 2, however, that there is up to 15 feet of soil in the "valleys" which is underlain by up to 30 feet of weathered bedrock, with some fractures extending to 60 feet below the surface. Whether these figures apply to the disposal site itself, only a portion of it, or to the general area is not clear. It is also not clear whether deeper fracturing is precluded. Fracturing of the shale bedrock would not be surprising, as it is a brittle material, is deposited in a relatively complex way in the vicinity of the site (as highly folded shale with local fine-grained sandstone interbeds, according to Ref. 1) and is subjected to the earthquake activity for which California is so well-known.

The point is that the disposal site is most certainly not sitting on or in a block of solid, impermeable material. While Ref. 1 states that the formation is devoid of "large open fractures," it also states:

> "...there are numerous seeps and corresponding saturated conditions in the bedrock which indicate the presence of significant bedding plane and/or minor fractures within the shale and siltstone...the fractured bedrock may transmit subsurface water of meteoric origin."

"Meteoric origin" implies the water originates at the gound surface. At this site, liquids available for transmission from the surface would primarily be rainfall, runoff or liquid wastes which were deposited at the site and which managed to reach the ground surface or the fractured zone.

Can the wastes reach the soil or the fractured zone? According to Ref. 1, the BKK landfill receives about 100 million gallons of liquid wastes per year and disposes of it by commingling with municipal refuse in roughly a 2:1 solids to liquids ratio by weight. The BKK Corporation has stated that the refuse "acts like a sponge," absorbing the liquids and retaining them, essentially indefinitely. The Subcommittee should determine on what basis this assertion is made, as other facts suggest

Testimony of Douglas M. Mackay, p.4.

that it is unlikely and raise several questions:

> Does the commingled waste remain wet indefinitely? If not, where do the liquids go? Do they evaporate?
>
> Is the Class I subarea lined in any way to prevent, or at least retard, liquid migration out of the subarea? Is there a leachate collection system in the Class I subarea? Has leachate been detected which originated in the subarea?
>
> What is the origin of the leachate that was discovered in 1972, according to Ref. 2, to have breached the first containment dam at the site?
>
> What is the origin and composition of the liquids that Ref. 2 states have been intercepted at the site's seepage barrier and surface-applied at the site for weed control? The latter use suggests that, the liquids are not uncontaminated.

If leachate from the Class I disposal area reaches the surface soils or fractured materials, as seems likely, then it can migrate either within the soil zone or within the fractures themselves. The reason this is important is that it is conceivable that significant quantities of hazardous compounds could migrate far and fast within the fractured zone.

Hydrogeologists would not think it unreasonable to assume a bulk hydraulic conductivity of 10^{-5} to 10^{-7} cm/sec, a fracture porosity of 10^{-3} to 10^{-4}, and a hydraulic gradient of 10^{-2} for fractured shale under common field conditions. Note that a fracture porosity of 10^{-4} would represent little more than hairline fractures in relatively wide spacing. These values correspond to a range for the average linear velocity of water moving in the fractures of about 1 to 1000 feet per year. Contaminants within the water might migrate more slowly than the water itself although the magnitude of this effect, if it occurs at all for a given contaminant, would be impossible to predict with any certainty. Very little is currently understood about contaminant transfer in fractured media. Furthermore, among fractured subsurface media, shale is the most poorly understood hydrogeologic domain at this time.

It would therefore be prudent to assume that if leachate containing hazardous compounds reaches the fractured zone under the BKK site, it may be capable of migrating at rates on the order of hundreds of feet per year, albeit in relatively small quantities due to the narrowness of the pathways provided by interconnected fractures. Nevertheless, a small quantity of a concentrated leachate could be of concern, either in the form of a contaminated seep which people or animals could unwittingly contact or in the form of an input to a surface or ground water, rendering the larger volume contaminated at a lower level, but perhaps, still high enough to be of public health concern. Ref. 2 states that the BKK site is "a few miles upstream from a useable groud water aquifer, the San Gabriel Valley hydrologic subarea." Because the water in that aquifer has naturally high levels of total dissolved solids and nitrates, it is not presently used for domestic purposes. This fact suggests that, unless the pattern of groundwater use changes in the area, the possiblility of contaminated seeps or other surface flows may be the concern with respect to the BKK landfill.

Testimony of Douglas M. Mackay, p. 5.

In conclusion, to begin to assess the potential for groundwater contamination that could affect the nearby community and its inhabitants, the Subcommittee should seek answers to the following questions from the agencies and individuals directly involved with the BKK facility:

> How well understood is the fracturing in the bedrock? Where would contaminated water go if it did reach the fractures? Is such migration occuring below the site?
>
> Do the containment structures and facilities that have been emplaced at the site intercept all surface and subsurface flow from the disposal areas? Is it possible that fracturing or other phenomena (e.g., seeping under containment dam as experienced in 1972 according to Ref. 2) allow the containment to be bypassed?
>
> Will the containment systems retain their integrity through time, especially after closure of facility operations? Can the containment systems withstand seismic activity? Are the containment systems affected by the leachate itself in some way that might compromise their effectiveness over time?
>
> Is the monitoring system adequate to detect bypassing of the containment system? Might the monitoring wells be bypassed by deep fractures or fractures that pass between wells but perhaps are not well-connected to the zone sampled by the wells?

Cited References:

1) SCS Engineers. Risk Potential Associated with California Secure Landfills: A Report with Case Studies. Prepared for the Environmental Protection Agency, Region IX, and the Office of Appropriate Technology, Governor's Office, State of California. May 13, 1981.

2) Plan for the Determination of Bed Rock Permeability at the B.K.K. Class I Site in West Covina, California. Attached to a letter from Joseph R. Johnson, Chief Engineer, BKK Corp, to California Regional Water Quality Control Board, Los Angeles Region. Dated April 3, 1981.

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August 1, 1983

Representative Ike Skelton
Committee on Small Business
Subcommittee on Energy, Environment and Safety
U.S. House of Representatives
H2-569, House Annex 2
Washington, D.C. 20515

Dear Congressman Skelton:

I would like to provide a brief follow-up to my testimony prepared for the fact-finding hearing on the BKK landfill held on June 3, 1983, in West Covina, California. Since the hearing I have had the opportunity to review additional information on the landfill which was drawn from the files of the California Regional Water Quality Control Board (RWQCB). The information was provided to me by Mr. Tom Whisenhunt and, I believe, was also included in the testimony submitted to your subcommittee by the Coalition of West Covina Homeowners' Association.

From the RWQCB memoranda and other sources in their files, it appears that many of the issues I raised in my testimony may warrant further attention. There is evidence in the files, for example, that a not insignificant quantity of water can move through the subsurface, even well below the superficial weathered and highly fractured zone (i.e., through the bedrock). As one example of this evidence, seepage was noted when a trench was excavated into the bedrock; the trench was meant to allow "keying" of the containment dam into the impermeable substrata, so that liquids could not escape under the dam. However, the seepage showed that the bedrock was not impermeable, at least at the depths intercepted by the trench. In addition, deep borings discussed in the file showed evidence of seepage and, therefore, permeable zones.

Thus it is not at all clear that the containment dam is sufficient to prevent subsurface migration in the area in which it was constructed. Furthermore, the likelihood or consequence of subsurface migration in other directions or areas not affected by containment structures is poorly understood, as far as I can tell.

This lack of understanding is compounded by the fact that the monitoring wells are few and, apparently, designed to sample water in the upper weathered/fractured zone. It is not clear that these wells would be capable of detecting contaminant migration if it were occuring via relatively deep fractures or permeable zones.

As in my testimony, I must qualify the above comments by emphasizing that I have certainly not reviewed all the information that is pertinent to these questions. What sources I have seen, however, leave many, and apparently significant, questions unanswered. Yet these same files show that the operators of the landfill have, for years, worked with the RWQCB and have hired consultants and firms to design and construct containment and monitoring systems to prevent or detect flow of contaminants in the subsurface. Many efforts have obviously been made. But those of us not privy to all the detail have yet to be presented with a straightforward and thorough demonstration that the efforts have been sufficiently successful to allay concern.

I hope that your investigation may either lead to such a demonstration or help define the additional efforts necessary to assess the capability of the BKK landfill to provide long-term containment for the hazardous wastes deposited therein.

Sincerely,

Douglas Mackay

Douglas M. Mackay, Ph.D.
Research Associate

cc: Congressman Esteban Torres
Mr. Tom Whisenhunt

Mr. SKELTON. Thank you, Doctor.

Congressman Torres.

Mr. TORRES. I would like to get back to the initial speaker, Dr. Perrine. In your testimony you described recycling or conversion and waste reduction techniques. How close are they to real commercial use today and also could you describe some way wherein we as legislators or the Federal Government could be the driving force that you mentioned in the pursuit of better handling of waste?

Mr. PERRINE. Well, the technology is very well established. What are you talking about really? It is simply the same kind of incineration that is going on with this facility with a couple of little things added. You recover the heat instead of just rejecting it to the outside environment. Instead of just having an open fire, you have some means of capturing that and using it, for example, either for cogeneration of electricity or ideally near some kind of a facility where you can use the steam—you can make steam easily—and just use that as part of your normal processing energy.

The other requirement is that for the capture of the hydrochloric acid you have to absorb it and you go through further treatment, but as I indicated, the processes are well established. They are in the established literature.

Mr. TORRES. In this country?

Mr. PERRINE. Oh, yes, sure. The author of this is James J. Santoleri, of Trane Thermal, Conschohoken, Pa. It is a consulting firm, performing engineering from the designs and building facilities.

This is not unusual. Examples are all through the literature, but unfortunately it is the kind of approach that has never really taken hold. A primary problem is that many of the individual opportunities seem like relatively small targets. You know, $1 million here, $1 million there, that is not much money, not except to us folks. But the fact is that quite honestly there are real opportunities there, although you have to be very careful because, for example, the person who goes into the business must be assured that there is a continuing activity. You can't invest and just make this profit off of 1 year's activity. You want it to go on for several years.

As far as what you can do, the State of California over the last several years has provided a strong push toward nonlandfilling techniques. They have done everything. In fact, our prior administration has been yelled and screamed at saying that, by golly, you just can't do all of these things at once.

Frankly, I think some of that our State-mandated effort is good. In a sense it is parallel to the pressure that was put on the automotive industry by the Clean Air Act. The Clean Air Act was technology-forcing. Today, you see automobile designs which are not only fuel efficient, but also air pollution efficient, which we never would have had without very, very strong legislation. You need to have something that provides a driving force of that nature. I am not the political leader who can say what the driving force should be, but you need something that just says, "thou shalt not do these things—landfill some wastes—unless you can really prove that there is no alternative." I don't think we have done that. The alternatives exist, but there has been no pressure to put them into place.

It is the kind of a situation where, quite honestly, the technology you are working with requires much more skilled scientific background and management than many other kinds of profit producing activities, and that tends to be restrictive. People would rather look toward something that is a little easier to manage.

Mr. **Torres**. Thank you. I have no further questions, Mr. Chairman.

Mr. **Skelton**. It is heartening, Dr. Perrine, to hear you speak with a bit of vision, looking down the road. I was fortunate enough to be able to go out to the BKK landfill and the gentleman was very kind to show Congressman Torres and me around and I asked the question how much longer can we expect this landfill to be able to be used. I will ask him that question a bit later, but my recollection is that they said in the neighborhood of some 20 years. What happens after 20 years? That is where your thoughts are coming in.

Congressman Torres did ask the pertinent question of you, and I think you did explore my—one request, Doctor, is that you allow us to enter this article into the record and make it part of the permanent record of these proceedings, if we may, and if so, if you would so consent to that, if you would leave it with the reporter when you leave.

Mr. **Perrine**. I would be happy to do so.

[The article referred to above follows:]

Resource Recovery—A Byproduct of Hazardous Waste Incineration

Acid-recovery systems enable a much more rapid write-off of capital expenditures for waste-incineration systems.

James J. Santoleri, Trane Thermal, Conshohocken, Pa. 19428

During the 70's, there was a considerable expansion of facilities for the production of monomers used in plastics, such as styrene, vinyl chloride (VCM), and toluene diisocyanate (TDI). With the buildup in both the construction and automotive industries, there was a continual rising need for these plastic materials. These were attractive products since energy requirements for their production were considerably less in comparison to the ferrous and nonferrous alloys which they replaced. They also provided a lighter-weight material easier to maintain and less prone to corrosion.

Vinyl chloride monomer (($CH_2 = CHCl$) is the main building block for vinyl plastics and is the only monomer of the three containing chlorine. VCM is produced by dehydrochlorination of ethylene dichloride made from ethylene and chlorine. In the process of production, vent gases as well as liquid waste streams, are generated which must be disposed of properly. Several methods are available to solve these waste-disposal problems. Producers must look carefully at the total cost of disposal in deciding the methods to be applied. In every case this is a necessary operating expense which cannot be avoided. Regulations promulgated by the Environmental Protection Agency in December of 1977 covering polyvinyl chloride (PVC) plants, and again the Resource Conservation and Recovery Act (RCRA) of January 23, 1981, require that all plants involved in the generation of toxic and hazardous wastes are responsible for adequate disposal—a "cradle to grave" responsibility.

Several schemes have been used for the on-site disposal of wastes generated from these plants. These have included carbon adsorption, chemical fixation, solvent absorption, and incineration. Present regulations require a 99.99% destruction and removal efficiency (DRE) of all Principal Organic Hazardous Constituents (POHC) [1]. Incineration is "the only answer" to the ultimate disposal of these halogenated waste materials [2]. Industry has gained a considerable amount of expertise in these areas over the past 20 years. There are incineration systems operating today where chlorinated waste (Table 1) materials are being disposed of properly. However, in many cases optimum conditions of combustion and absorption are not achieved. It is of primary importance that the capital and energy requirements of these systems be optimized. With disposal costs becoming an ever-increasing percentage of facility operating costs, we must strive to maximize the return on investment of the waste-disposal facility.

Table 1. Typical Sources of Chlorinated Organic Waste Products

Process or Product	Typical Waste Products
Vinyl Chloride Monomer	Ethylene Dichloride Ethyl Chloride Vinyl Chloride
Epichlorhydrin Propyl Oxide	Dichloropropylene
Propylene Glycol	Dichloroisopropyl Ether
Insecticides	Benzene Hexachloride Hexachloro Butadiene Octochloro Cyclopentene
Chlorinated Elastomers	Dichloropropylene
Herbicides	Carbon Tetrachloride Tetrachloroethylene
Nylon	Dichloropropylene

This paper covers the three principal areas of a chlorinated hydrocarbon waste-disposal system for a typical VCM facility (See Figures 1, 2). These will be the incinerator, the energy-recovery system, and the byproduct-recovery system. Throughout this discussion, please note that the overall efficiency of the energy and byproduct-recovery systems is dependent on the optimization of the primary combustor (incineration system).

INCINERATOR

The objective in incinerating residues containing chlorine is to convert as much as possible of the chlorine content to hydrogen chloride. HCl can be absorbed in water from the reaction-gas mixture. In this way, reusable hydrochloric acid is recovered in an environmentally safe way. The quantity of chlorine contained in the waste is often the measure of the heating value of the waste material. High chlorine percentages are typical of wastes produced in the VCM process (see Figure 3). Heating values in the range of 3500 to 8000 Btu/lb (8.14E6 to 18.6E6 J/kg) are typical [3]. The need for auxiliary fuel is most often the first question to be asked—how efficiently can an industrial incinerator combust a

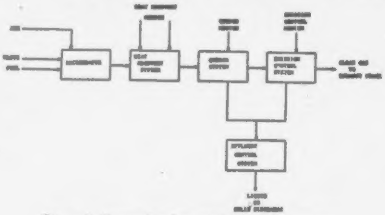

Figure 1. Generalized waste incineration system.

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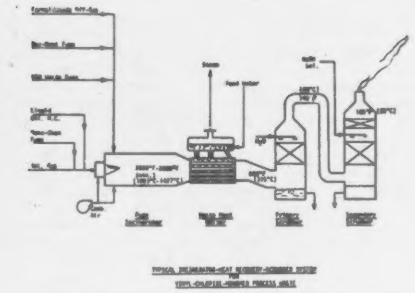

Figure 2. Incinerator-heat recovery-scrubber system.

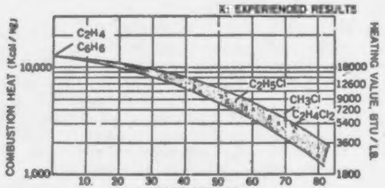

Figure 3. Heat of combustion of chlorinated hydrocarbon.

low-Btu waste, and how much purchased fuel is required to operate? Next, it is important to know how close to stoichiometric ratios the burner can operate without soot formation. Chlorinated hydrocarbon fuels tend to be slower burning. As a result, many systems have operated with high excess air to promote mixing of the oxygen with the hydrocarbons to minimize soot formation. In many cases this has required the addition of auxiliary fuel to overcome the drop in flame temperature with high excess air. This also increased operating horsepower and the sizing of downstream pollution-control equipment. High excess air also promotes the formation of a much higher level of free chlorine [4]. These may not appear as problems in the incinerator since the results will indicate proper destruction of the POHC's. However, problems will occur in the waste-heat recovery equipment, as well as in the downstream scrubbers. Free chlorine is much more aggressive than hydrogen chloride in attacking metals. Free chlorine requires caustic in the final tails tower for proper pollution control when scrubbing, while HCl is freely absorbed in water. It is also important that the combustor be designed for thorough mixing of air and wastes, thereby achieving maximum combustion efficiency. This promotes maximum temperature levels achievable under equilibrium conditions and minimum flame lengths. This will require proper refractories selection to withstand the temperatures which will be reached in these high-efficiency combustors. Proper instrumentation and control will permit operation below the maximum safe temperature of the refractory. Water and steam cooling are often used for this purpose [5] (see Figure 4). A situation did exist where a waste fuel having a heating value of 8000 Btu/lb, (18.6E6 J/kg) had a theoretical flame temperature of 3800°F (2093°C). The steam cooling prevented overheating of the refractory and also provided an excess of hydrogen to minimize the chlorine.

The incineration section should be designed with the following goals:

1) Minimize auxiliary fuel requirements.
2) Operate at minimum excess air.

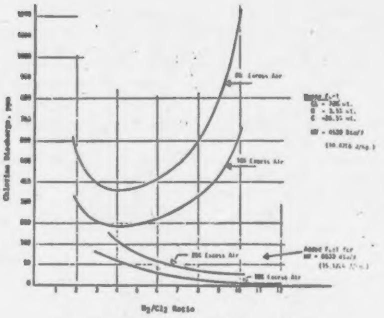

Figure 4. H_2/Cl_2 ratio vs. chlorine discharge.

3) Minimize free chlorine.
4) Utilize a highly turbulent combustor to provide maximum flame temperatures in minimum chamber volume.
5) Minimize soot formation.

ENERGY RECOVERY SYSTEM

It has only been within the past 10 years that waste-heat recovery in the form of steam generators has been used successfully in chlorinated hydrocarbon waste-disposal systems. Operators had many fears concerning the corrosion problems which would result with tube bundles exposed to high-temperature gases (1800 to 3000°F), (982 to 1648°C) containing hydrogen chloride, chlorine, oxygen, and water vapor. Under the proper conditions these gases will aggressively attack a carbon-steel boiler tube. Experiences typical in the waste-heat boilers of refuse incineration plants have concerned many plant operators. Most refuse plants had minor quantities of PVC; operating temperatures were lower; particulate was contained in the flue gases; and the incinerator operated at high excess air levels. Studies conducted on these problems show that a carbon-steel surface may be used provided that metal temperatures do not exceed 500°F or drop below the dewpoint of the combustion products (250 to 300°F) (121 to 148°C) (see Figure 5). Steam can be generated at pressures of 200 to 500 psig (1379E3 to 3447E3 Pa) utilizing a firetube boiler design.

Gas-side conditions which are important to a long operating life of the waste-heat boiler are as follows:

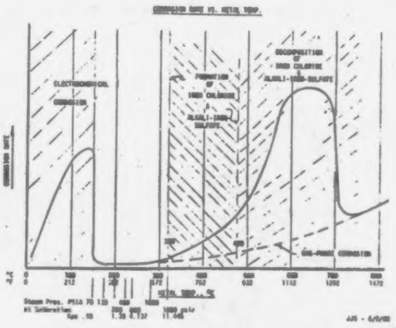

Figure 5. Corrosion rate vs. metal temperature.

1. A uniform gas temperature entering the tubes.
2. A high velocity of gases through the tubes to prevent ash buildup and promote good heat transfer.
3. Stack-gas temperatures sufficiently high to prevent dewpoint corrosion (most critical at turndown conditions).

As mentioned above, a good combustor in the incinerator chamber is needed to insure uniform conditions entering the tube sheet. Problems have occurred in systems where a central core of hot gases created by the burner caused overheating of the central tubes of the firetube (see Figure 6). This eventually caused distortion of the tube sheet due to the differential metal temperatures. The refractory lining protecting the tube sheet and the tube-to-tube joint eventually cracked and failed. This caused overheating of the tube sheet, causing failures at the welded joints. Once a leak occurred, the water-side high pressure allowed water to enter the hot gas stream and catastrophic corrosion by hydrogen chloride resulted.

It is just as important to insure good circulation on the water side of the boiler. Units are designed with a separate steam drum (see Figure 7). This insures a high flow recirculation rate from the drum to the shell-and-tube exchanger. With the return flow entering at two downstream connections, circulation is created with the steam risers located at the upstream end nearest the tube sheet. With the high rate of steam generation occurring at the tube sheet and at the entrance to the tubes, this insures high heat-transfer rates at these locations, insuring a uniform cooling of these metal parts. This permits operation of the carbon-steel tubes and tube sheets well below the high-temperature corrosion level. Improper design in this area could create the same maldistribution of temperature as is created by poor incinerator and combustor design [7]. By maintaining the saturated steam pressure at 200 psig/ (1379E3 Pa) or higher, the dewpoint corrosion problem can be overcome.

Waste-heat boilers are capable of recovering 70 to 75% of the total heat release in the incinerator. In the vinyl chloride monomer plants, capacities of incineration systems have varied from 30 to 150 MM Btu/hr (8.8 to 44 MM Watt). In most cases these systems operate continuously, 8000 hours per year. The heat available from these systems will reduce the need for burning fossil fuels to generate steam. At today's fuel prices and those forecast over the next 20 years, the payback of heat recovery systems occurs in most cases in less than two years.

Mr. J.P. Grace of W.R. Grace expects that energy will come close to the prices below: [8]

Besides the advantage of generating steam, the waste-heat boiler serves as a primary cooler for the hot incinerator gases. Temperatures leave the boiler in the range of 500 to 700°F (260 to 370°C). This reduces the water load on the system necessary to quench and scrub the gases of HCl. In many areas where the VCM plants are located, water usage is restricted. By cooling the gases from 2600°F to 600°F (1425°C to 315°C) using a waste-heat boiler, the water requirements for cooling are reduced almost 85%.

BYPRODUCT RECOVERY SYSTEMS

Combustion products from the incineration system are as shown in Table 3.

Typical composition of gases leaving incinerator chamber and boiler exhaust.

The quantity of hydrogen chloride resulting from the combustion of waste chlorinated liquids and gases is a fair percentage of the total products. The major products are nitrogen and water vapor. Since HCl is readily absorbed in water, it becomes economical to add the necessary quench and absorption unit to produce acid up to azeotropic (18 to 20%) concentration. Experience has been gained in the design and operation of these absorbers (see Figure 8). Major

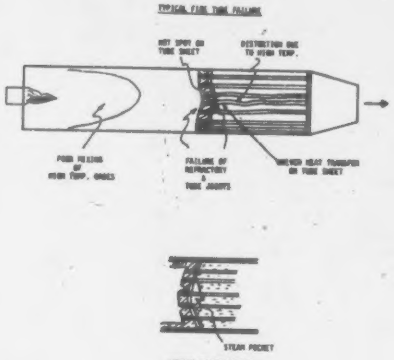
TYPICAL FIRE TUBE FAILURE
HOT SPOT ON TUBE SHEET
DISTORTION DUE TO HIGH TEMP.
POOR MIXING OF HIGH TEMP. GASES
FAILURE OF REFRACTORY & TUBE JOINTS
UNEVEN HEAT TRANSFER ON TUBE SHEET
STEAM POCKET
BOWING OF TUBE SHEET DUE TO UNEVEN TEMP.

Figure 6. Typical gas temperature profile from laminar flames.

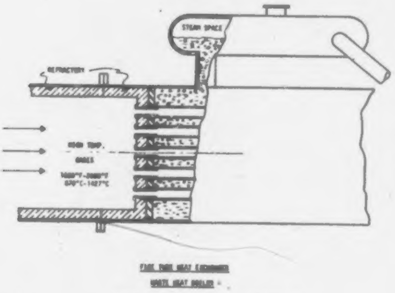

Figure 7. Waste heat boiler.

TABLE 2*

		Oil	Gas	Oil	Gas
		$/BBL	$/MCF	$/MM Btu	$/MM Btu
1950		2.51	.06	.43	.06
1960		2.88	.14	.50	.14
1970		3.15	.17	.54	.17
1980		27.00	1.70	4.66	1.70
1985	low	42.50	5.25	7.33	5.25
	medium	55.00	6.25	9.48	6.25
	high	80.00	8.50	13.79	8.50
1990	low	60.00	12.50	10.34	12.50
	medium	89.50	15.50	15.43	15.50
	high	135.00	23.00	23.28	23.00

*$\$/\mathrm{BBL} \times 6.29 = \$/\mathrm{M}^3$
$\$/\mathrm{MCF} \times .0353 = \$/\mathrm{M}^3$
$\$/\mathrm{MM\ Btu} \times 9.478\mathrm{E}{-10} = \$/\mathrm{J}$

TABLE 3. FLUE GAS COMPOSITION VOL. %

Oxygen	-	2.6%
Nitrogen	-	65.8%
Carbon dioxide	-	14.4%
Water	-	7.5%
Hydrogen chloride	-	9.7%
Chlorine	-	485 ppm

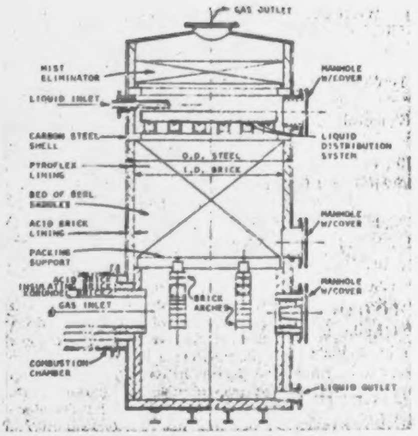
GAS OUTLET
MIST ELIMINATOR
LIQUID INLET
CARBON STEEL SHELL
PYROFLEX LINING
BED OF BERL SADDLES
ACID BRICK LINING
PACKING SUPPORT
ACID BRICK
INSULATING BRICK
CORUNDUM
GAS INLET
COMBUSTION CHAMBER
MANHOLE W/COVER
LIQUID DISTRIBUTION SYSTEM
O.D. STEEL
I.D. BRICK
MANHOLE W/COVER
MANHOLE W/COVER
BRICK ARCHES
LIQUID OUTLET

Figure 8. Composite packed tower.

hurdles had to be overcome in the proper material selection to minimize the corrosion problems inherent with the hot-cold interface, support grids for tower packing, and wall construction to stand both temperature and corrosion.

Systems have been supplied to produce acids at concentrations up to 100% anhydrous HCl (see Figures 9, 10). In all cases the efficiency of these byproduct acid-recovery systems is dependent upon the efficiency existing in the combustion system. A good quality acid is soot-free (less than 10 ppm organics) and contains less than 100 ppm of free chlorine. In order to achieve this, it is important that the combustor in the incineration system completely oxidize the organics in the waste and, at the same time, produce as low a chlorine content as possible. As shown above, it is important to minimize excess air to maintain low chlorine levels and, at the same time, produce low organic (hydrocarbons) levels in the exhaust gases [9,*10*].

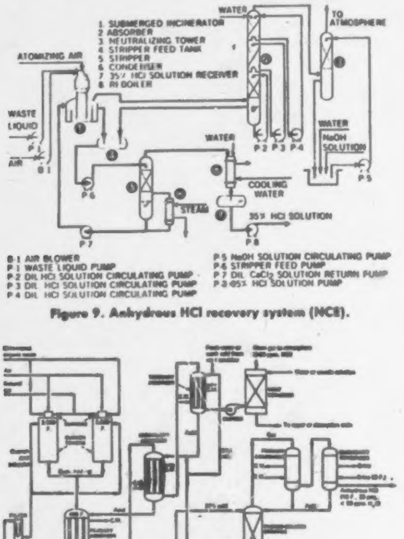
1 SUBMERGED INCINERATOR
2 ABSORBER
3 NEUTRALIZING TOWER
4 STRIPPER FEED TANK
5 STRIPPER
6 CONDENSER
7 35% HCl SOLUTION RECEIVER
8 REBOILER
WATER
TO ATMOSPHERE
ATOMIZING AIR
WASTE LIQUID
AIR
B 1
P 1
P 2 P 3 P 4
WATER
NaOH SOLUTION
P 5
WATER
P 6
COOLING WATER
STEAM
35% HCl SOLUTION
P 7
P 8
B-1 AIR BLOWER
P 1 WASTE LIQUID PUMP
P 2 DIL HCl SOLUTION CIRCULATING PUMP
P 3 DIL HCl SOLUTION CIRCULATING PUMP
P 4 DIL HCl SOLUTION CIRCULATING PUMP
P 5 NaOH SOLUTION CIRCULATING PUMP
P 6 STRIPPER FEED PUMP
P 7 DIL CaCl2 SOLUTION RETURN PUMP
P 8 35% HCl SOLUTION PUMP

Figure 9. Anhydrous HCl recovery system (NCE).

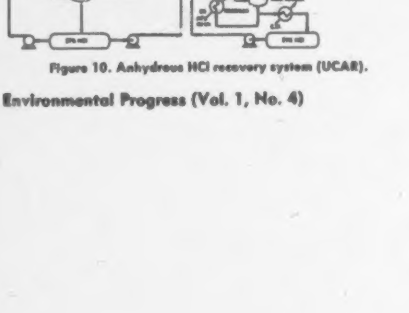

Figure 10. Anhydrous HCl recovery system (UCAR).

In order to minimize operating costs of a typical waste-disposal system, it is well to review the amount of caustic required in the tails-scrubbing tower. This tower is needed to scrub the HCl that leaves the quench-absorber system, as well as the free chlorine that has been produced. The quench-absorber (primary scrubber) must remove as much HCl as is economically possible. Many towers are undersized and, as a result, a high volume of HCl breaks through. Proper packing height, packing, sizing, and selection will reduce the HCl breakthrough, utilize the water for scrubbing most effectively, and minimize the need for caustic in the final scrubbing tower. Other important considerations in the primary tower design are the water-vapor concentration of the inlet gases, the temperature of the inlet gases, and the inlet temperature of the scrubbing water. Each will have an effect on the size of the tower [*11*]. The addition of a waste-heat boiler upstream has the advantage of reducing the water vapor content of the gases as well as giving a reduction of the temperature.

The final scrubbing tower is needed to produce final effluent gases to the atmosphere with chlorine less than 5 ppm and hydrogen chloride at less than 10 ppm. The final tower is normally constructed from fiber-reinforced plastics (FRP materials) since the inlet temperature is reduced to levels below 200°F (93°C).

ECONOMICS OF ENERGY RECOVERY AND BY-PRODUCT RECOVERY

The example shown in Table 4 lists the waste quantities typical in a vinyl chloride monomer plant. Also listed are the utility requirements for the incineration system, as well as that required for the quench, absorber, and scrubber. Note that the costs indicated for steam and acid produced are typical. Values which are more common to the particular plant site may be inserted. This should also include utility cost, labor cost, etc. In the example, note the savings that can result by the addition of the energy-recovery and acid-recovery systems. These will pay for the operation of the waste-disposal system and return money to the plant. Due to the size of this particular unit, it will pay for itself in less than one year.

A smaller system would have a longer payout period. Systems with heat-release rates of 10 MM Btu/hr (10.55 × 10^9 J/hr) and above should be designed with both energy and byproduct recovery. Below this size it is not always practical or economical. Waste-disposal costs by other means are continually increasing due to transportation costs, landfill costs, etc. Typical landfill costs for liquids that have been stabilized by the generator vary from $200 ($6857/kg) to $400/ton ($13714/kg) at various approved sites. Incineration costs at off-site facilities vary between $200 to $700 per drum for liquids, depending on the quantities supplied. This is equivalent to $1000 to $3500/ton ($34,285 to $120,000/kg). With fuel prices going up as indicated in Table 1, these costs are bound to escalate accordingly.

The new requirements of RCRA have also minimized the number of satisfactory disposal sites. It now becomes more practical to consider on-site disposal of these waste materials. This is the only solution when handling vent gases. However, in many cases, waste liquids from chlorinated hydrocarbon installations have been trucked to off-site disposal sites.

TABLE 4. EXAMPLE OF VINYL CHLORIDE WASTE DISPOSAL SYSTEM

Specifications

Wastes — A. 11,250 lb/hr. max. waste tars (5103 Kg/hr.)
3,400 lb/hr. norm. @ 50 psig (1542 Kg/hr. @ 345E3 pascal)
B. 21,545 lb/hr. max. vent gases (9773 Kg/hr.)
(202,400 SCFH) @ 3 PSIG (5731 M^3/hr. @ 21.E3 pascal)

Thermal Oxidizer

Rating — 70 × 10^6 btu/hr. (73.854 × 10^9J/hr.)
Combustion Air — 12,500 SCFM @ 75" W.C. (5.9 M^3/S. @ 1.905 M - 223 KW) 300 HP
Atomizing Steam — 3400 lb/hr. @ 175 psig (1542 Kg/hr. @ 1.206E6 pasc.)
Cooling Water — 0 to 20 GPM @ 40 psig (0 - 1.26E-3 M^3/S @ 2.75E5 pasc.)
Natural Gas — 0 to 25000 SCFH @ 4 psig (0 - 708M^3/hr. @ 2.75E4 pasc.)

Waste Heat Boiler

Inlet Gases — 2200°F, 10.4% HCL, 13.6% H_2O (1204°C)
Steam Produced — 52,470 lb/hr. @ 180 psig (23800 Kg/hr. @ 1260E3 pasc.)
Blowdown — 5830 lb/hr. @ 215°F (2645 Kg/hr. @ 102°C)

Hydrogen Chloride Recovery Tower

Water Flow — 340 GPM @ 40 psig — 60°F (2.145E-2 M^3/S @ 2.75E5 pasc.-15°C)
Acid Produced — 100 GPM - 15% HCL (6.31E-3M^3/S)

Caustic Scrubbing Tower

Scrubbing Liquor — 1650 lb/hr. — 10% N_aOH (748 Kg/hr.)
Discharge — 1650 lb/hr. — 14% Salts (748 Kg/hr.)
Recycle Pump — 10 HP (7.46 KW)

Operating Costs

Utility Costs

Item	Unit Cost	Consumption	Cost $/hr.
Steam	$5/1000 lb. ($0.011/Kg)	3400 lb/hr. (1542 Kg/hr.)	$17.00
Pure Water	$.541/1000 gal. ($.143/M^3)	110 gpm (6.94E-3M^3/S)	$ 3.57
Cooling Water	$.066/1000 gal. ($.0174/M^3)	250 gpm (15.775E-3M^3/S)	$ 1.00
Elec. Power	$0.04/KW	310 Hp (230 KW)	$ 9.25
Caustic	$0.06/lb. ($0.1323/Kg.)	165 lb/hr. (74.84 Kg/hr.)	$ 9.90
Total			$40.72

Installation Cost

Equipment Cost × 2.5 = $2,500,000.00
(Includes Foundations, Site Preparation, Structural, Piping, Electrical, etc.)

Labor Cost

2.5 persons = 0.5 person per shift × 3 shifts & 1 person
Average annual wage — $20,000
Overhead — 150%
Hourly Cost = 2.5 × 20,000 × 2.5 ÷ 8000 = $15.63/hr.

Depreciation

Installed Cost depreciated over seven year period — $2,500,000 × 0.9 × 1/7 × 1/8000 = $40.18/Hr.

Interest, Maintenance Costs, Etc.

Interest Rate = 15% of total installed cost.
Maintenance = 3% of total installed cost.
Other Expenses = 3% of total installed cost.
Total = $2,500,000 × 0.21 × 1/8000 = $65.62 hr.

Summary of Operating Costs

Utility Costs	$40.72
Labor Costs	$15.63
Depreciation	$40.18
Interest, Maintenance, etc.	$65.62
Total Operating Costs per hr.	$162.15/hr.

Continued

Summary of Recovery Options

Steam Generation 52,470 lb./hr @ \$5/1000 lb. = \$262.35/hr.
(23,800 Kg/hr. @ \$.011/Kg)

Hydrogen Chloride Recovery.

100 gpm. of 15% HCL @ .208/gal. = \$187.50/hr.
(6.31E-3 M^3/S) (\$54.95/M^3)

Total Recovery ______ \$449.85/hr.

Most process plants require steam, and fossil fuels are burned for this steam production. When required on a continuous basis, it is advisable to consider the addition of energy recovery, using a waste-heat boiler on a waste-disposal system. As covered earlier, it is important to determine the composition of the products of combustion and their effect on the materials of construction of the waste-heat boiler. As shown above, it has been fairly well documented with regard to chlorinated hydrocarbon waste systems. Ten years ago this would not have been considered because of the lack of installations and experience. Systems have now been installed and proven in service with continuous operation without the maintenance problems that had been contemplated.

With the cost of raw materials such as hydrogen chloride continually rising, it is advisable to consider the addition of an acid-recovery system in these waste-disposal plants. As can be seen from the example, the hydrogen-chloride recovery more than balances out the total operating costs of the plant.

This, of course, has been based on the value of hydrogen chloride at \$0.206/gal (\$54.95/M^3). It is important to review the economics of a particular situation. This, of course, will help to determine the need for the additional equipment. These systems have been installed and are now operating, and have been proven in service. Now it is really up to the individual plant sites and their needs for energy recovery and byproduct production to determine whether these additions can be justified. From an economic standpoint, note that they will certainly cover the cost of disposal and allow the waste-disposal end of the plant to be a profit center for the operation, rather than an operating expense with no return. Waste-disposal systems can be profitable if designed and installed with total economics included in the facility design.

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J. J. Santoleri received his B.S. and M.S. degrees from Drexel University in Philadelphia, and he is a registered Professional Engineer in the State of Pa. He holds patents on heat exchangers and incineration systems. He is Vice President of Applied Technology with Trane Thermal and is a member of AIChE, ASME, and NFPA and many other professional societies.

Mr. **Skelton**. Dr. MacKay, now, you explained the waste water system as groundwater that is going down through the cracks and et cetera and the processes there. Let me ask you about the other kind of water that I inquired about earlier.

In this landfill, as I am sure in other landfills, they have a collection of water, which I call a pond, that they use. A good part of it is rainwater. I suppose some of the other is water that permeates down through the ground and collects and they use this to clean trucks, to spray to keep the dust down, which is a daily thing. Now, this type of water, I am asking you, do you have an opinion, Doctor, as to whether this water can be contaminated or not?

Dr. **MacKay**. I don't know exactly where that pond is, I must say, but presuming that it is downgradient——

Mr. **Skelton**. It is way down.

Dr. **MacKay**. It seems to me that it is likely that it is contaminated.

Mr. **Skelton**. What could it be contaminated by, Doctor?

Dr. **MacKay**. At least generally the ways that it could get contaminated is by water flowing over the surface and picking up contaminants or percolating through, in essence, and leaching them out.

Mr. **Skelton**. What is the stuff that is causing this contamination in your opinion?

Dr. **MacKay**. Pardon me? What chemicals?

Mr. **Skelton**. Yes.

Dr. **MacKay**. It could be a wide range of things. From what I understand, the range of chemicals that are disposed of at BKK is extremely wide, anything from organic chemicals, the solvents that we heard described before, tetrachloroethylene, halogenated organics, tricholoroethylene, phenolic compounds from oils, inorganic species that are soluble, metals, and so forth.

Mr. **Skelton**. All right. Now, this pond that is used to collect the rainwater and the other type of water that we have been describing, were that same water to clean trucks or to spray and hold the dust down, is it possible for any of the contaminants in that water to be distributed to the general population as a result of the trucks entering and leaving that area?

Dr. **MacKay**. You know what I would suggest is that you let Dr. Perrine answer at least part of that question. I would like to address the first part, if I may, and that is my particular interest and knowledge would relate to where that water would go vertically. In other words, if you have a pond, it is extremely likely that it is in hydraulic continuity or connected with water which is in the ground and you would have one route, which would simply be subsurface. It would be very hard to see and the only way you would know it was moving is if you had an adequate monitoring system to find it. That could be of concern. I am not sure that it is at BKK, because I don't have enough information, but I think Dr. Perrine might have a few comments on that.

Mr. **Skelton**. Could you help us on that, Doctor?

Mr. **Perrine**. Yes, very definitely. Suppose that you did have some contaminant materials, and they could be either inorganic or organic materials, which are toxic. It could be conceivably elements like cadmium, metals which are potentially harmful and could be carried to the pond. I am not saying these are present, but it is possible. There also could be compounds, particularly halogenated hydrocarbons, which tend to be reasonably water soluble and are carried by the water into the pond. Then if you spray that mixture on some ground surface out in the air, what you end up with is what is called in air pollution terms a fugitive source. You end up with dust which is contaminated with these substances, and the dust particles are going to be blown around and carried off. Fortunately, only a small quantity of the source material is likely to be there, but essentially you do have a fugitive source——

Mr. SKELTON. Is it possible for some of these dust particles to be contaminated with carcinogens?

Mr. PERRINE. Yes. Certainly. Fortunately, I think the quantities we are talking about will be small, but it is certainly something that should be considered, including by the Air Pollution Control staff.

Mr. SKELTON. Doctor, in your opinion, should this pond that supplies the water on the landfill, should that be tested periodically as to its content?

Mr. PERRINE. Definitely. It should be tested on a routine basis. This is a traditional type of case where you have different agencies each with their own mandated responsibility who haven't coordinated, perhaps, as well as they could.

Mr. SKELTON. Counsel.

Mr. ORBAN. Thank you, Mr. Chairman. I have a couple of questions. First of all, let me ask Dr. MacKay, you may have heard earlier when I talked to the Water Quality Control Board that they had said that to the best of their knowledge there was no leakage through the containment at the bottom. Do you know of any leakage through the containment at the bottom of BKK?

Dr. MACKAY. Of course, I don't know of it directly, simply because I have never been involved directly with the BKK facility. However, some of the documents that I reviewed indicated that relatively rapidly—immediately after the containment structure was put in place—a bypassing of the containment structure was noted. I don't know what the quality of that water was. I don't know on what basis that statement was made and so forth, but, on the basis of that observation, apparently, the containment structure was modified to include, let's say, a seepage or a leachate-containing collection system underneath that containment structure.

So, it seems to me that there must have been some concern or else they wouldn't have gone to the expense to do that. Now, I don't know whether that was contaminated water. If it hadn't been, I don't know how they would have known that that passed the structure.

Mr. ORBAN. Thank you. Dr. Perrine, I particularly appreciate your testimony about possible solutions. I think that is the direction which we have to look and I think that is one of the areas about which this subcommittee, as you could tell from earlier questions, is vitally concerned.

We have found in our studies that those groups that do innovative thought and come up with the new methods tend to be small businesses. Small businesses get the thing rolling and the work done. We have some testimony today, which we will include with the chairman's permission for the record, testimony from a local company in Long Beach, Calif., Environmental Services Division, of a process they have which touches on a method that you mentioned, which is treating hazardous waste before you transport it, thereby reducing its volume.

It is an onsite mobile unit that can treat waste to reduce it to a sludge, take the water out of it, clean enough theoretically for it to be imbibed and then——

Mr. PERRINE. You are talking about thin film evaporation, no doubt?

Mr. ORBAN. Right. And it is that kind of thing we need to pursue. This particular company, as I understand it, is having problems getting any interest economically. They can't compete or can't get off the ground in competing with a landfill, but given the opportunity, they feel they could compete very well. They just need to be able to expand and there is no help available to them.

I assume what you are suggesting by Government action is that perhaps we should look at policies that head that direction, that find alternative sources?

Mr. PERRINE. I am no expert on these things, but the kind of actions I would think of is that there must be some way in which you can provide access to funding for organizations which can show that they have a potentially very useful process to tide them over until the period with a payback. This is something that I believe was suggested in your recent OTA-sponsored study of the basic problem. That is the kind of approach that really can have an impact. I really do believe it is hard for small organizations, which tend to be much more innovative than massive large organizations, to get going. That is where the ideas are and that is where your progress is likely to be made.

Mr. ORBAN. Thank you very much. With the Chairman's permission, I would like to enter this testimony, which unfortunately we couldn't hear today, into the record.

Mr. SKELTON. The testimony of the Environmental Services Division of ENV, Inc. will be entered in the record without objection.

[The prepared statement of the Environmental Services Division of ENV, Inc. follows:]

PREPARED STATEMENT OF THE ENVIRONMENTAL SERVICES DIVISION, ENV INC.

ENV, Incorporated, dba Environmental Services Division (ESD) has been in business since February 1, 1973. ESD provides environmental engineering services to about 175 industrial clients in Los Angeles and Orange Counties. This service covers the following areas:

- Preparing all industrial wastewater documentation required between the client and the cognizant regulatory agency.
- Monitoring the client's industrial wastewater discharge and preparing required reports for submittal to the agency.
- Designing and installing wastewater monitoring and treatment systems for the clients.
- Provide calibration and repair services for monitoring and treatment systems.

ESD has retained over 90% of its clients on a continuous basis since initial contracts started. These companies represent over twenty different industry categories. The services provided are directed by the Federal Water Pollution Control Act (Public Law 92-500). About 75% of the companies generating wastewater do not have the type of engineering personnel to perform these tasks in-house. In most cases, it is more cost effective to contract these services with ESD. The experience and data acquired by ENV Inc. over the years has allowed it to become the expert in wastewater engineering. It is this experience and data base that forms the "know how" and expertise required for the Industrial Wastewater Treatment System which has been developed by the company.

Realizing there was a vast need for safe disposal of liquid waste on-site without the capital expense of a stationary plant, the Company decided in 1981 to develop a mobile system which would provide a much needed service for the thousands of metal working plants in Southern California. Regulatory agencies were quick to realize the many advantages of such a system which would eliminate customary hauling in tank trucks on highways. Dumping in landfills has provided serious havens for toxic pollutants that have caused untold harm and damages to the public. A proven system which Environmental Services has now developed exclusively, may lead to the eventual closing of landfill dumpsites to liquid waste disposal.

In Los Angeles and Orange Counties, there is currently a market for this service of $18,000,000 annually from the metal finishing industry alone. The market is considerably larger in Northern California. Nationally, the market in major industrial cities will be huge.

The Company's immediate plans are to purchase and equip 20 mobile treatment vehicles which will be based at a property to be acquired shortly which will be convenient for servicing the Southern California market. An additional property will be acquired in the San Jose area to service the Northern California market. Further expansion is planned as soon as equipment and trained personnel can be made available.

The owners of the Company realize they have a top priority service which should be made available to the market almost immediately, once the regulatory agencies recognize the ability of the Company to provide the service. As ESD does not presently have sufficient capital to undertake the rapid growth desired themselves, it has been decided to sell the Company to an organization which is sufficiently capitalized for this admirable undertaking. This very profitable business opportunity is unique and will have the blessings of all environmental and regulatory agencies.

ENV, Inc. is now ready to expand its operations in three areas:

1. Environmental and Industrial Wastewater Service to Industry

   Services provided include permitting (through regulatory agencies), testing, monitoring, engineering, and reporting waste water discharges. The market in Southern California (LA and Orange Counties) is approximately 7,000 companies which have permits to discharge waste water (but must conform to stricter enforcement). There are about six laboratories in the area which can test waste water. Only ESD offers full service which is becoming most important to the continuing operation of many plants. Some of them will likely be required to install limited treatment facilities (which ESD constructs).

   The market for this service, with additional financial support, can be expanded rapidly to $3-5,000,000 within eighteen months.

2. Development of a Central Stationary Liquid Waste Disposal Plant

   Plans have been approved, but require funding, to proceed with construction of a large plant (3-4 acres) which will be capable of handling all treatable industrial liquid waste which is now being hauled to landfills over busy highways. The local, state, and Federal agencies want to stop the discharge of industrial liquid waste at landfills as soon as possible, thus, eliminating legalized pollution. Toward this end, ENV, Inc. has designed and received approval to construct a three acre treatment facility.

   With adequate financial support, the construction of a central plant can be assured in the near future. The project has been approved by the California Pollution Control Financing Authority.

3. Commence Operation of a Mobile Van On-Site Liquid Waste Disposal Fleet

Treatment of hazardous waste is the most critical problem facing Southern California at this time. It is also true of other major industrial areas throughout the country. Small businesses may not be able to afford their own stationary plant and may be prohibited from use of landfills. Therefore, ESD Division of ENV Inc., has developed a mobile treatment system directed at the metal finishing companies (800) in Southern California (LA and Orange Counties). They all use Vacuum Truck and Dump Services at a charge of around $18,000,000 per year. Using a 4200-gallon Vacuum Truck, the charge is about $900 per trip.

The State of California does not want toxic liquid wastes going to landfills. Therefore, the 20 mobile units will be the first alternate treatment approach. The 20 units on a six-day week will handle 7500 treatment calls per year. This will be about $4,750,000 profit per year on 37% of the present market. Additional markets will also be developed depending upon availability of capital. This market will be dictated by law and will grow as fast as van technician operators can be trained. The potential in the rest of California and other industrial areas of the country is obvious.

ENV INC. MANAGEMENT

The Company President and founder, Robert Speach, is a graduate Mechanical Engineer from Syracuse University. For the past ten years he has been very active in the new field of environmental engineering, with emphasis on industrial waste water. He is considered an authority in his profession. His previous employers included General Electric, Ramo Woolridge, Ling-Temco-Vought, North American and Aerospace Corporation.

Colonel E.F.W. Eisemann is Executive Vice President and Administrative Officer. He is a retired Air Force officer with a Masters Degree in Business Administration from Columbia University.

Quinton C. Johnson is Director of Engineering. He is a Mechanical Engineer and has thirty-five years experience in the aerospace industry.

Charles E. Mugleston is Manager-Engineering and Project Engineer for new projects. He has a degree in biology form UCLA.

John Adams is Marketing Director. He has a broad background in business management and marketing.

Other staff personnel include chemists, monitoring technicians, and lab assistants. Additional key personnel will be added shortly with expansion of Company operations within the next two months.

PLANT FACILITY

Company headquarters are presently located at the plant in Long Beach. Negotiations are in progress to purchase a prime facility at an excellant location which will provide adequate indoor storange of vans and equipment, testing labs and offices.

* * * * * * * *

All cognizant regulatory agencies (State Health, Los Angeles County Sanitation, Los Angeles City Sanitation, Orange County Sanitation) have been advised and are working with ESD to bring this system into operation as soon as possible.

Environmental Services Division offers a unique investment opportunity for extraordinary high profits in a brand new industry which will have the support of all groups - environmentalists, governmental agencies, politicians and the public.

OCT 13 19

STATE OF CALIFORNIA—RESOURCES AGENCY

EDMUND G. BROWN JR., Gover

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
LOS ANGELES REGION
107 SOUTH BROADWAY, SUITE 4027
LOS ANGELES, CALIFORNIA 90012-4596
(213)620-4460

OCT 7 - 1981

California Pollution Control
Financing Authority
915 Capitol Mall, Room 110
Sacramento, CA 95814

RE: Authority Application for Financing - Environmental Services Division
(Application #549)

Gentlemen:

Upon review of the water pollution control project described in the subject application (the "Project"), it is hereby certified on behalf of the California Regional Water Quality Control Board, Los Angeles Region, as follows:

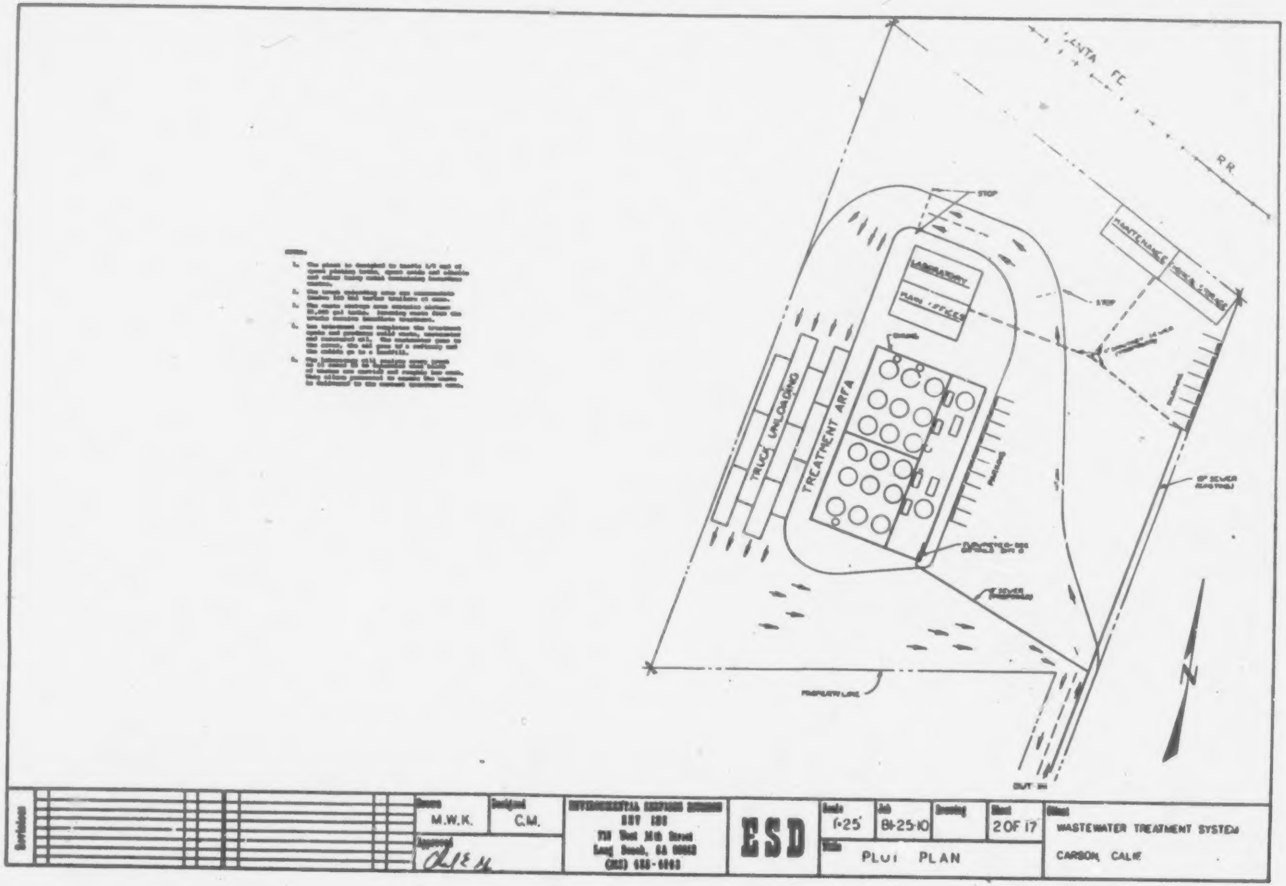
1. The Project, as designed, will further compliance with federal, state or local pollution control standards or requirements.

2. The Project, as designed, is in furtherance of the purpose of abating or controlling water pollutants or contaminants.

Very truly yours,

Raymond M. Hertel

RAYMOND M. HERTEL
Executive Officer


SANTA FE R.R.
MAINTENANCE
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Designed C.M.
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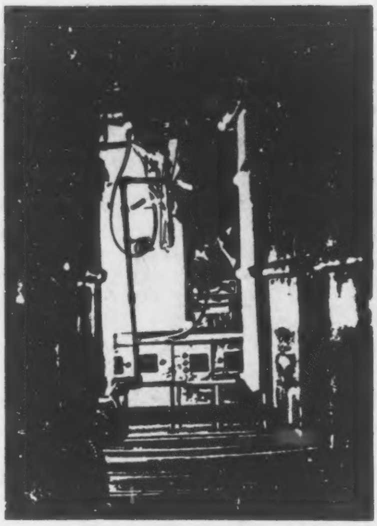
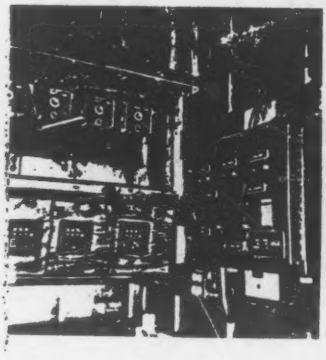
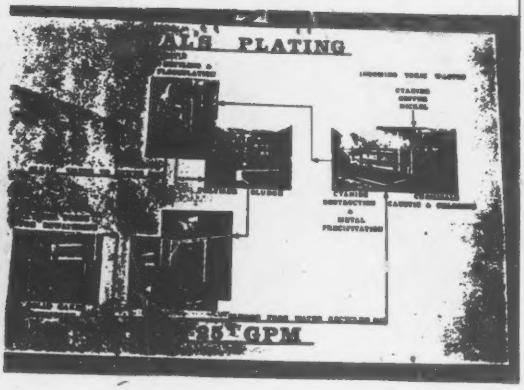
Client WASTEWATER TREATMENT SYSTEM
CARSON, CALIF.



MOBILE VAN




ALS PLATING
CYANIDE
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&
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PRECIPITATION
SLUDGE
35± GPM

ESD

ENVIRONMENTAL SERVICES DIVISION • Env Inc.

15 October 1982

Beverlee A. Myers, Director
DEPARTMENT OF HEALTH SERVICES
714/744 P Street
Sacramento, CA 95814

SUBJECT: HAZARDOUS WASTE LAND DISPOSAL

Ms. Myers:

Your memorandum and supporting logic dated 8-18-82 on the subject, has been reviewed by my staff and myself. Environmental Services Division (ESD) of ENV Inc. will not have a representative at your hearing on 21 October 1982. However, having spent 12 years in the industrial wastewater field, I am taking this opportunity to document our feelings on this subject.

ESD has been servicing up to 185 industrial clients over the past 12 years. Our clients cover the following industry categories:

Airlines	(1)	Furniture Mfg.	(1)
Automotive	(2)	Glass & Porcelain	(5)
Beverage Products	(5)	Hospitals	(5)
Bulk Materials	(13)	Liquid Haulers	(7)
Chemical Operations	(11)	Meat Packers	(4)
Laundries	(29)	Metal Finishers	(42)
Dairy Products	(4)	Metal Processors	(21)
Firearms	(1)	Mining	(1)
Food Processing	(13)	Oil Operations	(10)
Pet Foods	(2)	Refrigeration & Storage	(1)
Printing	(1)	Roofing Products	(1)
Recreational Facilities	(1)	Salt Products	(1)
Paper Products	(4)		

718 WEST 14th STREET • LONG BEACH, CA. 90813 • PH. (213) 435-4868

In service to these clients, we document the wastewater generation process, periodically test the discharges, monitor flow and pH control systems, and design and install treatment systems to meet regulatory agency standards.

Needless to say, our experience qualifies us to comment authoritatively on the subject. After the terrible pollution accidents in our country over the past five years, no-one can state it is safe to dispose of hazardous liquid wastes to a landfill area. Some of us close to this wastewater field know that the publicized incidents only skim the surface of the real world situation. Our experience and engineering efforts in this field, verify that chemical treatment of about 50% of these hazardous liquid wastes utilize simple, state-of-the-art procedures, that are cost effective.

Your proposed changes in the regulations controlling Hazardous Waste Disposal make good sense technically, economically and environmentally for the citizens of this state you work for. Your approach will not hurt industry (especially small businesses), and in the long run will save ALL toxic waste-generating industry dollars in disposal fees.

In addition your approach will, in the future, lead to recovery of various commodities in the wastes that will be very beneficial to the nations economy. These new regulations will be a first giant step toward the termination of all land-fill operations in the future; which is a goal that will significantly clean up the environment with NO EFFECT on the industry that has made this country the world leader in living standards.

Sincerely,

M.R. Speach, President
Environmental Services
Division - ENV Inc.

MRS/eg

cc: Heidi West, Office of Planning & Research
Peter Deibler, Office of Appropriate Technology

ESD

ENVIRONMENTAL SERVICES DIVISION

Env Inc.

EXPERIENCE SUMMARY

The following list of client companies, and services rendered, is offered for your information as an indication of Environmental Services Division (ESD) capabilities and scope of experience in the environmental engineering field. ESD has field experience in the following environmental services:

- Wastewater Discharge Surveys and Definition
- Wastewater Monitoring and Reporting
- Wastewater Pretreatment Engineering Surveys
- Wastewater Pretreatment Economic Trade-off Analysis
- Pretreatment Hardware Systems Design and Documentation
- Pretreatment Hardware Systems Turn-Key Installations
- Interfacing with Regulatory Agencies as Required
- Environmental Impact Surveys and Subsequent Reports Development
- Off-shore Surveys, Monitoring and Reporting
- Thermal Effects Surveys, Monitoring and Reporting
- Temperature Monitoring and Reporting
- Bulk Materials (coke, coal, potash, etc.) Sampling and Testing

In addition, ESD management has provided environmental laws and regulations analysis to various clients; as well as formally lecturing industrial, professional and other groups.

References are available upon request.

ESD

SPECIAL ENVIRONMENTAL STUDIES

For **Boise Cascade** Fort Bragg, CA
ESD prepared layouts of wastewater discharge systems, sampled and analyzed the ocean outfalls, and conducted dye dispersion tests. We made a biological survey of the beach and of the fish and other organisms in the adjacent waters. We recommended improvements and alterations.

For **U. S. Naval Undersea Research Center** San Clemente Island, CA
ESD conducted a survey of the waste treatment facilities and made a layout of the water system. We made an analysis of the outfall water and an ichthyological survey in the outfall area. We prepared the Technical Report to the California Regional Water Quality Control Board.

For **Carmel Sanitary District** Carmel, CA
ESD conducted a one-year monitoring program to document the existing environment prior to the installation of an outfall. This included a biological inventory, and laboratory analysis of receiving water and sediment samples. We assessed the environmental impact of the outfall.

For **Hughes Helicopter Company** Long Beach, CA
ESD has a continuing program of monitoring the thermal effects of a warm water discharge into an estuary. We have taken hourly readings for over a year, monitored the thermal plume, made monthly biological surveys, and prepared reports for the California Regional Water Quality Control Board.

For **Marina, County Water District** Monterey County, CA
ESD conducted a survey of the waste treatment facilities and prepared a layout of the intake and discharge water systems. We made dye dispersal tests and biological surveys. We prepared a technical report for the State Water Resources Board. We are now engaged in a one-year survey of the environmental impact of the discharge on the local marine environment.

For **Metropolitan Stevedore Company** Port of Long Beach, CA
ESD continually monitors the temperature of bulk materials loaded on cargo vessels in accordance with Coast Guard regulations.

For **Del Monte Corporation** San Francisco, CA
ESD was solicited by Del Monte to conduct a detailed survey of their tuna production facility in Mayaguez, Puerto Rico. This program resulted in a very comprehensive report including technical, operational and fiscal trade-off data; with regard to meeting EPA wastewater discharge regulations.

ESD

AIRLINES

TWA

AUTOMOTIVE

Cormier Chevrolet
Predelivery Service

BEVERAGE PRODUCTS

Coca-Cola Bottling Co. - Downey
Coca-Cola Bottling Co. - Vernon
Coca-Cola Bottling Co. - Los Angeles
Pepsi-Cola Bottling Co. - Azusa
Pepsi-Cola Bottling Co. - Carson

BULK MATERIALS

Champlin Petroleum Co.
Coastal States Energy
Colowyo Coal
Continental Coke
Great Lakes Carbon
Kerr McGee Corporation
Maryland Coal & Coke
Metropolitan Stevedore
Plateau Mining
David H. Sutherland
Texas Gulf Chemicals
Toyomenka (America) Inc.
Mid-Continent Resources

CHEMICAL OPERATIONS

Amoco Chemicals Corp.
B. F. Goodrich Chemical Co.
Baron-Blakeslee
Leeder Chemicals
PPG Industries
Peterson/Puritan
Philadelphia Quartz
Purex Corporation
State Chemical
Swift Adhesives
Western Adhesives

ESD

COMMERCIAL INDUSTRIAL LAUNDRIES

Beacon Laundry
Budget Uniform Rental Supply
Community Linen Rental
Blue Seal Laundry (Southern Service Co.) - Riverside
Blue Seal Laundry (Southern Service Co.) - Ontario
Blue Seal Laundry (Southern Service Co.) - Monrovia
Blue Seal Laundry (Southern Service Co.) - Long Beach
Blue Seal Laundry (Southern Service Co.) - San Diego
Blue Seal Laundry (Southern Service Co.) - Pomona
Eagle Industrial Uniform Rental
Foasberg Laundry & Cleaners
Harbor Industrial Uniform
Industrial Control Systems
Maryatt Industries
Master Linen & Towel Supply Service
Milum Textiles
Modern Coverall & Uniform Supply
Morgan Linen Supply
National Linen Service
Nuway Linen & Industrial Rentals, Inc. (2)
Red Star Industrial Service
Renta Reliable
Renta Uniform & Towel Supply
Supreme Laundry Company (Kleen Kraft Uniform Supply)
Tidy-Didy Diaper Service
U. S. Industrial Glove
Uniform Rental Service
Welch's Overall Cleaning Company
Western Linen Supply Company

DAIRY PRODUCTS

Foremost-McKesson Foods Group
Gardenia Cheese Company
Masson Cheese Company
Sierra Cheese Company

ENGINEERING

Ashley-Martin Engineering

FIREARMS

Mathews & Sons

FOOD PROCESSING

- Bell Brand Foods, Inc.
- Best O'Spuds
- Case-Swayne Company, Inc.
- CPC International
- Golden State Distributors
- Green Boys Foods
- Kern Foods
- Larry's Foods
- Redi-Spuds of America
- Santa Fe Importers
- Thrifty Drug Stores
- Vince Farms

FURNITURE MANUFACTURING

- Maxwell Products

GLASS & PORCELAIN OPERATIONS

- Cal Tuf Glass
- Champion Mirror
- Downey Glass Company
- Glass Arts
- Holiday Porcelain

HOSPITALS

- City of Hope
- Harbor General Hospital
- Long Beach Memorial Hospital
- Martin Luther King Hospital
- South Bay Hospital

LIQUID HAULING

- Allyn Transportation
- Calzona Transportation
- City Tank Lines
- Crosby & Overton
- Culligan Deionized Water Services
- IT Corporation
- Torrance Wastewater Disposal

MEAT PACKERS

- Burnett & Son
- Choe Meat Company
- Hoffman Brothers Packing Company
- Kruse & Son

METAL FINISHING COMPANIES

- Acme Metal Finishing
- Active Magnetic Finishing
- Aerotronics
- Air Cargo
- Al's Plating
- Anadite Metal Finishing
- Astro Plating
- Brownline Division
- Cal Bumper
- Cal Chrome
- Chrome Craft
- Carbco Industries
- Coast Plating
- Control Plating
- Cragar Industries
- Custom Plating
- Decor Plating
- Electronic Plating Service
- Enthone, Inc.
- Fred's Radiator
- Freeman Products Division, AVNET Corp.
- Gaylord Inspection Lab., Inc.
- Goldenwest Plating
- J. P. Research & Engineering
- Martin Metal Finishing
- Metal Treaters
- Quality Hardware
- R & M Plating
- S & K Industries
- S & K Plating
- Sargent-Fletcher Co.
- Solder Station I
- Standard Precision
- Surface Engineering

METAL FINISHING COMPANIES (Cont'd)

Rexnord Specialty, Fastener Division
Tridair Industries
Triple A Accessories
Universal Plating
U. S. Chrome
Verne's Chrome Plating
Western Electro-Plating Co.
Western Galvanizing

METAL PROCESSING

Aerojet Ordnance & Mfg. - Chino
Aerojet Ordnance & Mfg. - Compton
Aerojet Ordnance & Mfg. - Downey
Anaplex Corporation
CBC Industries
Crest Steel Corporation (Marcrest Pacific Co.)
Harris Tube
Hi-Shear
Industrial Steel Treating
International Extrusion
Kreiger Steel
Modine Manufacturing
Norris Industries
PGP Industrial
Quality Aluminum Forge
Rayjay Industries, Inc.
Reynolds Metals Co.
Semetex Corporation
Stellite
Tree Island Steel
Pacific Sintered

MINING

Steen Mines

OIL OPERATIONS

Great Lakes Properties
CONOCO (Continental Oil Co.)
Chevron USA
Getty Oil
Lomita Gasoline

ESD

OIL OPERATIONS (Cont'd)

MacMillan Ring-Free Oil Co.
Oil Operators
Pauley Petroleum
Petro-Lewis Corp. (8 Facilities)
Shell Oil Co.

PAPER PRODUCTS

Abbey Corrugated Corp.
National.Plywood
Potlatch Northwest (Simpson Paper)
Specialty Paper Mills

PET FOODS

Lewis Food Div. of National Can Co. Pet Food Corp.

PRINTING

Andrews Printing Company

RECREATIONAL FACILITIES

GNS Development

REFRIGERATION & STORAGE

California Refrigeration Services

ROOFING PRODUCTS

Owens-Corning Fiberglas Co.

SALT PRODUCTS

Ocean Salt

TEXTILE DYEING

Hollytex Carpet Mills
Kronfli Spundale Mills
Lorber Industries
Mand Carpet Mills
Matchmaster
Tuftex Carpet Mills

TRANSPORTATION

Long Beach Public Transportation

ESD

ESD

ENVIRONMENTAL SERVICES DIVISION • Env Inc.

16 March, 1982

International Extrusion Corporation
1000 Meridian Ave.
Alhambra, Ca. 91802

Dear Sir:

ENV Inc. has designed a toxic wastewater treatment system; specifically tailored to treat wastewater from Plating & Metal Finishing Operations (cyanide, metals, acids). The facility will be located at the corner of Wilmington and Lomita in Carson.

Current Planning indicates that the system could be on-line as early as December, 1982. This wastewater treatment facility will meet the Governor's Directive to stop sending these industrial wastewaters to landfill operations.

The price per gallon will be at least 30% lower than the present fees; and it is possible that the new fee could save as much as 50% of the present fees. The facility location will offer considerable savings in trucking costs.

Various Federal, State, County & City agencies are very interested in seeing that this project is completed as-soon-as-possible. In our discussions and as part of the total project data package we want you to be aware of the project, and plan to use it to significantly lower your operation costs.

Sincerely,

Charles E. Mugleston
Chief Engineer
Environmental Services
Division- ENV Inc.

CEM/mjh

44000 HIGH PH
12000 LOW PH

My hazardous waste potential is approx. 56000 gallons/year, and I will use your facility if there are savings in my wastewater costs.

Signed ______________

716 WEST 14th STREET • LONG BEACH, CA. 90813 • PH. (213) 435-4868

24 Part I/Wednesday, May 26, 1982 ★

County Crackdown on Toxic Waste Ordered

By LEO C. WOLINSKY, *Times Staff Writer*

Thousands of Los Angeles County firms that produce toxic substances as a byproduct of manufacturing will be required to pay a licensing fee and submit to closer scrutiny under a planned crackdown on violators of hazardous waste laws.

An estimated 17,000 businesses—ranging from paper mills to dry cleaners—will be included in the inspection and enforcement program ordered Tuesday by the Board of Supervisors.

The plan, designed by the Department of Health Services in the wake of growing concern over improper storage and disposal of hazardous waste, calls for a 23-member task force of county inspectors. They, in turn, would have the authority to conduct surveillance and enforce state laws against industries throughout the county.

The board's unanimous approval of the plan came after supervisors received results of a yearlong pilot project that found the hazardous waste problem to be more widespread than earlier believed.

Project officials discovered, for example, that 42% of establishments subjected to spot inspections were in violation of state regulations governing hazardous wastes. Among the most common violations, the report said, was direct discharge of hazardous waste into the ground, disposal of dangerous substances in trash and inadequate record-keeping on disposal of toxins.

Supervisor Deane Dana, who moved Tuesday for the program's approval, released a statement claiming the crackdown will have a "measurable effect" on the overall hazardous waste problem.

"This populous and highly industrialized county is very vulnerable to the health effects of chemical wastes when they are unknowingly or carelessly discarded," Dana said.

He specifically cited the 1980 shutdown of more than 50 water wells in several parts of the county after the wells were found to be contaminated by tricholorethylene, or TCE, a known cancer-causing agent suspected to have come from improper disposal of industrial toxins.

Attention also was drawn to the problem in the highly publicized case of Capri Pumping, an Eastside Los Angeles firm that was cited for storing dangerous chemicals in a manner that would have allowed them to mix easily and form a deadly gas.

Angelo Bellomo, project director, said the county decided to become involved after state officials failed to act in the Capri case.

While the state has authority to enforce regulations of the California Hazardous Waste Control Law, state officials have concentrated on firms that treat or dispose of waste, not those that produce toxic substances as a byproduct of manufacturing.

According to Bellomo, Capri was among the firms not covered by the state permit program. "This will help us plug that gap," he said.

Bellomo said the program also is designed to stop alleged violations such as those noted at Aaro Inc., a South-Central battery recycling firm that was charged Tuesday with 28 counts of pumping hazardous wastes into city sewers.

Although the program was first proposed in early January, it had been held without action, partly because of concerns expressed by Board Chairman Pete Schabarum. He had questioned whether the program ultimately would affect thousands of additional businesses, but an aide to Schabarum said his concerns were answered in recent discussions with county health officials.

Illegal Dumping of Wastes on Rise

Officials Look for Increase Following Closure of Two Disposal Landfills

By RICHARD SIMON, *Times Staff Writer*

Government officials remain baffled over what has happened to the toxic waste that was going to the Calabasas and Palos Verdes landfills, which closed last year. There has not been a commensurate increase in business at the remaining Class I landfills. There is only one left in Los Angeles County—the BKK facility in West Covina.

"Nobody knows for sure where the material is going," said [illegible] Bergin, supervisor of hazardous waste engineering for the Los Angeles County Sanitation Districts.

"If somebody wants to go around the law, it's not that difficult," Bergin added. "We have 108,000 manholes in the county."

State officials said they had been anonymously warned that a toxic waste hauler in Gardena had been illegally dumping the substances on his own property.

In an attempt to catch the violator in the act, state investigators conducted a stake-out in conjunction with local police.

They did not witness the act, but investigators said they found high concentrations of lead and copper on the property. The state attorney general's office is looking into the case.

Jim Stahler, regional administrator of the state's hazardous waste management section, said cases such as this are being increasingly brought to his attention, although no statistics are available on the upsurge.

Evidence of Cyanide

Ken Terry, chief industrial waste inspector for Los Angeles, reported that some evidence of illegal dumping has begun to turn up in the form of cyanide at the Los Angeles-Glendale Water Reclamation Plant.

The discovery has prompted Terry to order a night watch on select manholes.

The cyanide—an extremely poisonous substance used in the metal plating business—does not constitute a danger to the general public, Terry stressed. Such substances are removed from the sewage during the treatment process, he said. Also, none of the treated sewage is reclaimed for human use anyway.

"Still, if concentrations are high enough, it could be dangerous to any person working in the system," Terry said.

[illegible] installed measuring devices in

WASTES: Illegal Dumping of Toxic Material Rises

Continued from First Page

sewer lines in the San Fernando Valley in an attempt to catch illegal dumpers, said Carl Tripp, industrial waste inspector in the Los Angeles bureau of sanitation. Tripp said the cyanide detected in the Los Angeles-Glendale Water Reclamation Plant came from lines serving the Valley.

Inspectors check the devices daily to determine if any toxic material has been dumped into the sewers, Tripp said. If any is found, the city will stake out the manhole the next night and attempt to catch the lawbreaker, Tripp said.

"We haven't caught anyone yet," Tripp said. "But it's just a matter of time."

"There's a lot of illegal dumping," added Richard Dennerline, chief of occupational health for the Los Angeles County Department of Health Services. "But most often, you're not fortunate enough to know who did it."

Authorities are catching some of the lawbreakers however.

On Feb. 12, a park ranger spotted a tanker unloading about 1,000 gallons of hazardous chemicals over an embankment near Angeles Crest Highway. The incident is under investigation by the district attorney.

In addition, health officials report finding 55-gallon drums of toxic wastes on vacant lots in the San Fernando Valley. "Any place there's a vacant lot, all of a sudden pops up a drum," Dennerline said. The health official added that it is "almost impossible" to trace drums back to their owners.

Still Penalties Possible

Illegal dumping of hazardous material carries a maximum penalty of $25,000 fine and one year in jail for the first offense, $50,000 fine and two years in jail for the second.

Roger Holt, head of the Los Angeles city attorney office's environmental protection section, said the toxic issue has occupied "60% to 70%" of the time of the two attorneys in his office and himself.

"It's been an explosion of work for us," Holt said. He said his office is investigating "a half dozen" cases of illegal dumping, although he declined to elaborate. City prosecutors are scheduled to go to court March 12 with a case against a Pacoima plating shop accused of dumping acid in the street.

The Los Angeles County Board of Supervisors in October adopted a motion by then Supervisor Baxter Ward to offer a $2,500 reward for information on "midnight dumping" and to study establishing a hotline for reporting of illegal dumping.

The hotline was never established. Ward was defeated in the Nov. 4 election. The directors of the county Departments of Health Services and Communications in a Feb. 18 memo to the Board of Supervisors said that since illegal dumping can be reported to the police, "establishment of a separate hotline would add a layer

said one man attempted to collect the reward but reported on an illegal activity of which the health department already was aware.

Robert White of the county Department of Health Services and George Tice of the county Department of Communications also said in their memo that the records of calls to law enforcement agencies would be available to verify reporting of illegal dumping in the event someone claims the reward.

Officials fear the situation may grow worse with the threatened closure of the BKK landfill. Responding to community pressure, the City Council in West Covina has ordered hearings on closing of the landfill.

Meanwhile, the state, working in cooperation with federal and local agencies, has begun a study to find new sites for the disposal of toxic waste. December is the target date for completion of the study.

County health officials also are investigating the dumping of "a couple of hundred gallons" of toxic waste off a road in Malibu, said Angelo Bellomo, head of the toxic substance program for the county Department of Health Services. Bellomo declined to be specific, saying the case is under investigation, but he did say the dumping would require "quite a cleanup."

JUNE - 81

Tuesday, May 31, 1983 The Register

Me

Hazardous wastes: Growing specter in the county

By Christopher Dee
The Register

With more than 100 million gallons of hazardous waste produced yearly in Orange County, officials say there is little wonder some of it ends up spilled at the industry site, splattered on the freeways or simply dumped into sewers, flood control channels and open fields.

Hazardous materials and their resultant wastes, generated from the manufacture of even safe household products, seem to be everywhere. "It's pretty spooky when you stop to think about it," said Chris Arnold of the Orange County Administrative Office. "It's just incredible. You wonder why something terrible hasn't happened already."

More than 14,000 Orange County businesses handle hazardous substances. They make products that touch almost every aspect of life, from gasoline to plastic spoons to medicine, pool chemicals to computer chips, fiberglass boats to newspapers.

By definition, hazardous materials and wastes are toxic, corrosive, flammable or irritating substances that may cause substantial injury, serious illness or harm to humans, domestic livestock or wildlife.

Hazardous wastes — produced when hazardous materials are used in industry — cannot be recycled and must be disposed of at special state-approved dumps. Hazardous materials can become hazardous wastes when they are spilled, leaked or dumped.

Some of the substances cause immediate damage. They burn clothes, lung tissue and skin on contact. The effect of other materials is difficult to ascertain. For example, many chemicals are carcinogenic. But certain cancers take decades to develop. By then, it becomes nearly impossible to select one cause out of all the possible environmental or hereditary factors.

Although nothing serious has happened in Orange County, said Bob Merryman, the county's director of environmental health, "the key word is 'yet.' We haven't had any major problems yet."

Officials are especially concerned about hazardous substances contaminating the water system, which becomes more likely over time because:

- The amount of hazardous wastes increases every year by an estimated 2 percent.
- The government constantly expands the list of chemicals and substances considered toxic and hazardous. Different governmental agencies have different lists, not all of which overlap. Currently listed are about 30,000 substances. "It's overwhelming," Merryman said.
- To avoid costly treatment, transportation and bureaucratic red tape, some producers simply ship their waste c.o.d. to non-existent addresses, abandon it in open fields or pour it untreated down sewers. The phenomenon is known as "midnight dumping" but occurs at any time of day or night.
- Although more waste is produced, new dumps are not being built. Only three landfills exist in Southern California to handle most toxic wastes. Those, of course, eventually will reach their capacity. Whenever government or private industry officials consider locating a new dump, they are deafened by cries of "Not in my neighborhood, you don't."

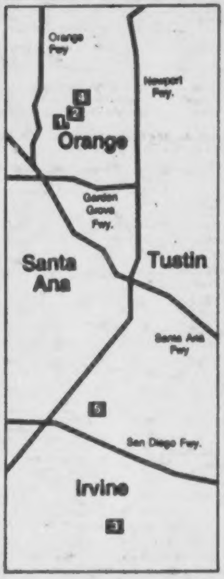
But while residents can complain about proposed dump sites, they have no control when a truck crashes on a local freeway or a leak occurs in an industrial plant nearby. Nor can they do anything when a midnight dumping occurs.

Generally, Merryman said, larger companies aren't responsible for this extremely dangerous — and illegal — activity. "Most of the industries are doing the right thing."

Santa Ana Fire Capt. Tim Graber said the small-time gen-

Please see WASTES/B6

HAZARDOUS SPILL LOCATIONS



1 March 30, 1980 — In Orange, Pennwalt Corp., 630 N. Batavia St. Two rotted chemical containers uncovered during excavation for new construction. Invisible cloud of noxious gas sent over city's west side. Chemical identified as mercaptan, used to give natural gas an odor. One hundred workers from companies adjacent to the plant were evacuated for two hours. Batavia between Collins and Walnut avenues was closed.

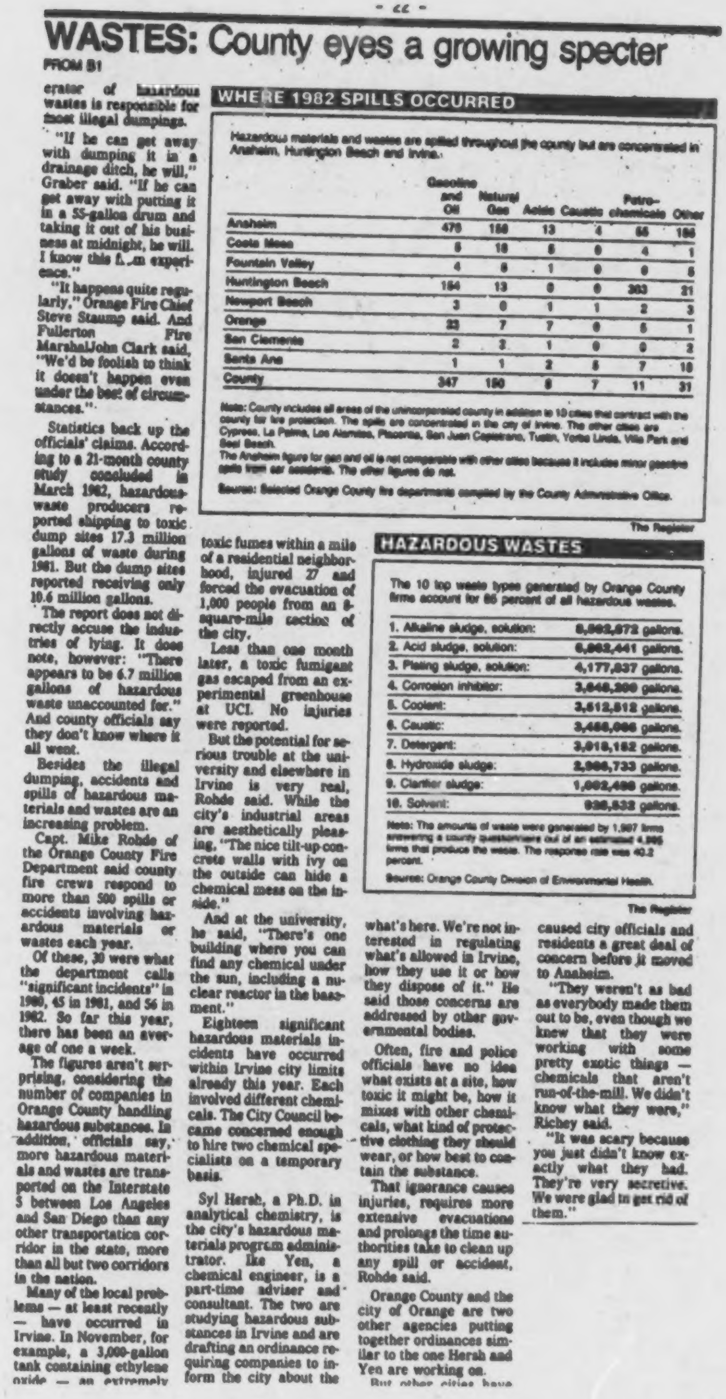
2 Feb. 28, 1983 — In Orange, Aero-Tech Plating Inc., 660 N. Lemon Ave. 125 people from homes and businesses on Cypress Street between Walnut and Collins avenues were evacuated for 6 hours. Nitric acid, sodium cyanide and other corrosives and poisonous chemicals leaked into storm drains. No injuries reported.

3 Dec. 7, 1982 — UC Irvine campus greenhouse. Two classroom buildings were cordoned off, 700 people, some taking final examinations, were evacuated from 10 buildings surrounding the greenhouse. Leaked was a toxic fumigant, Sulfa Tepp, which causes eye and skin irritations and can damage the respiratory system.

4 Nov. 31, 1982—Conden Oil and Chemical Co., 546 Strunk Ave. Orange. 2,000 people, including students from six neighboring schools, were evacuated from a 2-square-mile area for eight hours. Chemical leak caused an explosion and fire and spewed a cloud of fumes into the air. Chemical was styrene monomer, which can cause malignant tumors in the long run and headaches, nausea, dizziness and eye and lung irritation in the short run. Also can cause chemical pneumonia and damage to the central nervous system.

5 Nov. 12, 1982 — Bentley Laboratories, 17502 Armstrong Ave., Irvine, 1,000 people were evacuated from an 8-square-mile section of north Irvine for five hours. Ethylene oxide, a chemical sterilizer, was released in a colorless cloud of toxic fumes. The cloud blew within a mile of a residential neighborhood and the Marine air base in Tustin.

- Hazardous materials response teams are being developed in several Orange County jurisdictions, while local agencies wait for state grants/B6



WASTES: County eyes a growing specter

FROM B1

erator of hazardous wastes is responsible for most illegal dumpings.

"If he can get away with dumping it in a drainage ditch, he will," Graber said. "If he can get away with putting it in a 55-gallon drum and taking it out of his business at midnight, he will. I know this f..m experience."

"It happens quite regularly," Orange Fire Chief Steve Staump said. And Fullerton Fire MarshalJohn Clark said, "We'd be foolish to think it doesn't happen even under the best of circumstances."

Statistics back up the officials' claims. According to a 21-month county study concluded in March 1982, hazardous-waste producers reported shipping to toxic dump sites 17.3 million gallons of waste during 1981. But the dump sites reported receiving only 10.6 million gallons.

The report does not directly accuse the industries of lying. It does note, however: "There appears to be 6.7 million gallons of hazardous waste unaccounted for." And county officials say they don't know where it all went.

Besides the illegal dumping, accidents and spills of hazardous materials and wastes are an increasing problem.

Capt. Mike Rohde of the Orange County Fire Department said county fire crews respond to more than 500 spills or accidents involving hazardous materials or wastes each year.

Of these, 30 were what the department calls "significant incidents" in 1980, 45 in 1981, and 56 in 1982. So far this year, there has been an average of one a week.

The figures aren't surprising, considering the number of companies in Orange County handling hazardous substances. In addition, officials say, more hazardous materials and wastes are transported on the Interstate 5 between Los Angeles and San Diego than any other transportation corridor in the state, more than all but two corridors in the nation.

Many of the local problems — at least recently — have occurred in Irvine. In November, for example, a 3,000-gallon tank containing ethylene oxide — an extremely toxic fumes within a mile of a residential neighborhood, injured 27 and forced the evacuation of 1,000 people from an 8-square-mile section of the city.

Less than one month later, a toxic fumigant gas escaped from an experimental greenhouse at UCI. No injuries were reported.

But the potential for serious trouble at the university and elsewhere in Irvine is very real, Rohde said. While the city's industrial areas are aesthetically pleasing, "The nice tilt-up concrete walls with ivy on the outside can hide a chemical mess on the inside."

And at the university, he said, "There's one building where you can find any chemical under the sun, including a nuclear reactor in the basement."

Eighteen significant hazardous materials incidents have occurred within Irvine city limits already this year. Each involved different chemicals. The City Council became concerned enough to hire two chemical specialists on a temporary basis.

Syl Hersh, a Ph.D. in analytical chemistry, is the city's hazardous materials program administrator. Like Yen, a chemical engineer, is a part-time adviser and consultant. The two are studying hazardous substances in Irvine and are drafting an ordinance requiring companies to inform the city about the what's here. We're not interested in regulating what's allowed in Irvine, how they use it or how they dispose of it." He said those concerns are addressed by other governmental bodies.

Often, fire and police officials have no idea what exists at a site, how toxic it might be, how it mixes with other chemicals, what kind of protective clothing they should wear, or how best to contain the substance.

That ignorance causes injuries, requires more extensive evacuations and prolongs the time authorities take to clean up any spill or accident, Rohde said.

Orange County and the city of Orange are two other agencies putting together ordinances similar to the one Hersh and Yen are working on.

But other cities have

caused city officials and residents a great deal of concern before it moved to Anaheim.

"They weren't as bad as everybody made them out to be, even though we knew that they were working with some pretty exotic things — chemicals that aren't run-of-the-mill. We didn't know what they were," Richey said.

"It was scary because you just didn't know exactly what they had. They're very secretive. We were glad to get rid of them."

WHERE 1982 SPILLS OCCURRED

Hazardous materials and wastes are spilled throughout the county but are concentrated in Anaheim, Huntington Beach and Irvine.

	Gasoline and Oil	Natural Gas	Acids	Caustic	Petro-chemicals	Other
Anaheim	476	158	13	4	65	186
Costa Mesa	5	18	5	0	4	1
Fountain Valley	4	6	1	0	0	5
Huntington Beach	164	13	0	0	303	21
Newport Beach	3	0	1	1	2	3
Orange	23	7	7	0	5	1
San Clemente	2	3	1	0	0	2
Santa Ana	1	1	2	5	7	10
County	347	150	8	7	11	31

Note: County includes all areas of the unincorporated county in addition to 10 cities that contract with the county for fire protection. The spills are concentrated in the city of Irvine. The other cities are Cypress, La Palma, Los Alamitos, Placentia, San Juan Capistrano, Tustin, Yorba Linda, Villa Park and Seal Beach.
The Anaheim figure for gas and oil is not comparable with other cities because it includes minor gasoline spills from car accidents. The other figures do not.

Source: Selected Orange County fire departments compiled by the County Administrative Office.

The Register

HAZARDOUS WASTES

The 10 top waste types generated by Orange County firms account for 86 percent of all hazardous wastes.

1. Alkaline sludge, solution:	8,862,872 gallons.
2. Acid sludge, solution:	6,862,441 gallons.
3. Plating sludge, solution:	4,177,837 gallons.
4. Corrosion inhibitor:	3,648,209 gallons.
5. Coolant:	3,512,512 gallons.
6. Caustic:	3,466,086 gallons.
7. Detergent:	3,018,152 gallons.
8. Hydroxide sludge:	2,966,733 gallons.
9. Clarifier sludge:	1,002,498 gallons.
10. Solvent:	926,632 gallons.

Note: The amounts of waste were generated by 1,987 firms answering a county questionnaire out of an estimated 4,995 firms that produce the waste. The response rate was 40.2 percent.

Source: Orange County Division of Environmental Health.

The Register

As spills become more common, agencies arm to combat the threat

By Christopher Dee
The Register

Fire departments throughout California are racing for state grants that would enable them to better handle toxic accidents and spills.

Beginning July 1, the state will give local governments $2 million a year for 10 years. The money, part of a $10 million-a-year state "superfund" approved by the Legislature in 1981, is tailored to fight the increasing number of hazardous accidents and spills.

Half the $2 million each year is to be spent on specialized vehicles, equipment and reference libraries. The rest is to be used to clean up major spills.

Cody Begley of the state Department of Health Services said from his Sacramento office that he expects "almost every county in the state to apply for some sort of assistance."

Begley's department plans to give away eight fully equipped $90,000 vehicles by late this summer. The Orange County Administrative Office is sending a request this week for two. The Orange County Fire Chiefs Association is to decide where to place any vehicles the county receives.

At least five Orange County departments are in the running. But regardless of the grant, they have begun developing their own Hazardous Materials Response Teams.

The teams are known as HAZMAT or HAZMED teams.

Full-scale HAZMAT teams are relatively new — there are about 20 in the country — but they are becoming more popular as hazardous materials incidents become common. Fire Engineering Magazine, for example, devotes a section of each issue to hazardous materials, including articles on training HAZMAT members.

The Orange County Fire Department's HAZMAT team is scheduled to begin operating July 1 out of the county's Station 28 in Irvine.

Currently, Capt. Mike Rohde said, "We respond to problems to the best of our ability."

That often means waiting two hours or more for chemists and other specialists from environmental agencies and private companies to arrive at the scene of a spill, Orange Fire Capt. Steve Staump said. "Ideally, you'd like to have your own team so you know if something goes down you can handle it right away."

The quicker HAZMAT team response could translate into fewer or no injuries and less extensive evacuations or none at all. For example, Rohde said, a spill last November in Irvine took four hours to contain, injured 27 and forced the evacuation of 1,000. A HAZMAT team might have finished the job in 30 to 45 minutes with many fewer injuries and evacuees, he said.

The county Board of Supervisors earlier this month authorized spending $46,381 on special clothing and equipment for the team. Included are special meters that measure the level of toxic and flammable substances in air and water, reference materials on hazardous materials, "moon suits" with breathing apparatus, communications equipment and a variety of tools.

"The state vehicles won't have everything that's required for our area," said the County Administrative Office's Chris Arnold, who is administering the state grant application. "It's not a panacea. It's just to supplement what we have."

Orange County accidents involve a wide variety of chemicals, sludge, corrosives and toxic gases. Los Angeles County accidents typically are related to the oil industry.

> **O**range County accidents involve a wide variety of chemicals, sludge, corrosives and toxic gases. Los Angeles County accidents typically are related to the oil industry.

Here are the five Orange County fire agencies that hope to develop their own teams and claim a HAZMAT vehicle:

■ The Orange County Fire Department is confident of obtaining one vehicle because of the progress the department has made in forming its HAZMAT team and the large area it covers — all the unincorporated county, plus 11 contract cities.

■ The city of Orange Fire Department has submitted a budget request to the City Council for $100,000 to develop a HAZMAT team that would be fully operational within two years. The department already has selected personnel for the team.

"We feel there's a need," Staump said. "We've been extremely fortunate so far, with the number of accidents we have, that no one's been killed or injured yet."

The Orange-Anaheim area also experiences the second largest amount of spills and accidents in the county.

■ The Anaheim Fire Department, however, believes it is more suited for a HAZMAT vehicle, according to Anaheim Fire Capt. Tim Riley, because that city is in a geographic position to serve all of north Orange County if the need arises.

In addition, Riley said, the department would be able to man the vehicle with its existing budget and would not be required to ask the City Council for additional funds.

■ The Santa Ana Fire Department is in the "active research" phase of developing a HAZMAT team. "The city of Santa Ana recognizes a need for a hazardous materials team, either by itself or in conjunction with other cities," Capt. Tim Graber said.

More hazardous materials accidents occur in the Santa Ana-Irvine area than anywhere else in the county. But if the county's Irvine fire station is awarded one vehicle, fire officials say it seems unlikely that a second vehicle would be stationed so close.

■ The Newport Beach Fire Department plans to send its six captains to the National Emergency Training Center in Maryland for training in hazardous materials this year.

The department purchased a $36,000 utility truck to be used for hazardous material spills in addition to other firefighting duties. The department this year is seeking $10,000 worth of of special equipment for use by a Hazardous Materials Response Team. The team is to become operational in July, Chief August Wagner said.

Besides those five departments, the Huntington Beach Fire Department is forming a special HAZMED team — half hazardous materials and half medical emergency.

The medical part is designed to help fire officials respond to multiple deaths that could occur from bus or plane crashes or from terrorist activities, Fire Capt. Tom Poe said.

Tuesday, May 31, 1983 The Register B5

Friday, May 27, 1983 The Register

EPA checks out mystery waste drums

By Rod Speer
The Register

HUNTINGTON BEACH — The city began taking steps Thursday to require the removal of an estimated 500 to 1,000 barrels of potentially hazardous wastes from an acre-size lot in an industrial area north of Marina High School.

The barrels, suspected of containing paint-production wastes, are a potential fire threat and could contain toxic materials, said Christopher Weden of the Environmental Protection Agency.

Weden and another EPA investigator drove from San Francisco to Orange County this week with two Coast Guard representatives to inspect the waste site at 15571 Commerce Lane.

The city Fire Department and the federal Small Business Administration, which acquired the land through a foreclosure, hope to determine the nature of the abandoned chemicals before steps can be taken to clean up the site.

Several of the barrels, about 55 gallons each, were leaking. But Weden said that while the barrels emit an odor resembling paint, tests Thursday showed that the emissions were not great enough to pose a threat to people who work near the site.

Markings on some of the barrels say they contain flammable liquids and nitric acid, a toxic substance, said Richard Grunbaum, a city fire inspector. But Grunbaum and Weden said they cannot be sure what is inside the barrels without further tests.

EPA investigators took samples Thursday and will determine whether the material is toxic. If it is, the material would have to be removed to a toxic-waste disposal site, Grunbaum said. The nearest is in West Covina.

The contents of an additional 500 to 1,000 smaller containers on the site, ranging from a quart to 5 gallons in size, also are a mystery, investigators said.

Jack Eason, a loan specialist for the SBA, said the barrels were left by its previous owner, the now-defunct Standard Chemical Corp.

Eason said the firm made paint products in an adjacent 18,000-square-foot building and disposed of its wastes on the vacant parcel. Venus Laboratories, manufacturers of janitorial products, bought the building in 1980, but the company did not buy the adjacent land where the wastes had been disposed.

Venus Laboratories owner Van Vlahakis said the barrels have been sitting on the property since at least 1980, and may have been there since 1975.

LA Times 5/27/83

2 pumps idle at acid pits

Plume threatens drinking water

Associated Press

RIVERSIDE — Two pumps, unused because of a dispute between California and federal agencies, should be activated to prevent contaminated groundwater from reaching drinking water supplies, officials say.

Thomas Bailey, the state health official who oversees the abandoned Stringfellow industrial waste dump, estimated that a plume of contaminated groundwater is moving downhill from the dump about 250 feet to 400 feet a year and will reach the drinking water supply serving residential Glen Avon by 1988.

Donald Stierman, a geophysicist at UC Riverside, agreed with Bailey's estimate.

The plume was discovered in the mid-1970s and special wells were drilled to pump out the polluted water.

It now costs taxpayers $1.7 million a year to pump and haul the polluted water from the Stringfellow acid pits and its plume to the BKK toxic waste dump in West Covina. And winter storm runoff is draining into the canyon as fast as polluted water is pumped out, the Riverside Press-Enterprise reported Thursday.

James Anderson, executive officer with the Santa Ana Regional Water Quality Control Board, said the plume has formed a pool about halfway down Pyrite Canyon.

There are two pumps at that halfway point, capable of pumping 58,000 gallons a day, but the state isn't using them because of a dispute with the U.S. Environmental Protection Agency over who will pay for it, said Stan Phillippe, of the California Department of Health Services.

"The EPA didn't think it would do any good and won't pay for it," Phillippe said.

Anderson contends that pumping at those wells would stop the plume from flowing farther downstream.

"I agree with Anderson," Stierman said. "Those pumps should be running."

Trash Piles Up—Space to Bury It Shrinks

By RICHARD SIMON, *Times Staff Writer*

There was Los Angeles Mayor Tom Bradley, standing n front of a banner emblazoned with the words "TRASH CRISIS."

It was a rally on the City Hall steps, held during the unch hour, when Civic Center streets are teeming with eople. It was intended to call attention to the iminishing number of garbage disposal sites in Los ngeles County. It attracted fewer than a dozen people.

"People don't want to think about garbage," said Los ngeles City Councilwoman Joy Picus, a member of the alifornia Waste Management Board, a state agency hat will spend $500,000 this year to convince the public hat there is a trash crisis.

"They want to take it to the curb, bring in the empty ans and not worry about what happens to it."

Picus and other public officials are worried. What will appen to the county's 38,000 daily tons of trash as the

The Trash Crisis

Part 1: Running Out of Room

umber of disposal sites declines and public opposition new and expanded landfills grows stronger?

In 1980 the county had 19 major landfills. Today there e 17. By the end of next year, unless approval is given r new or expanded landfills, the number will be down 12 disposal sites. They are rapidly filling up.

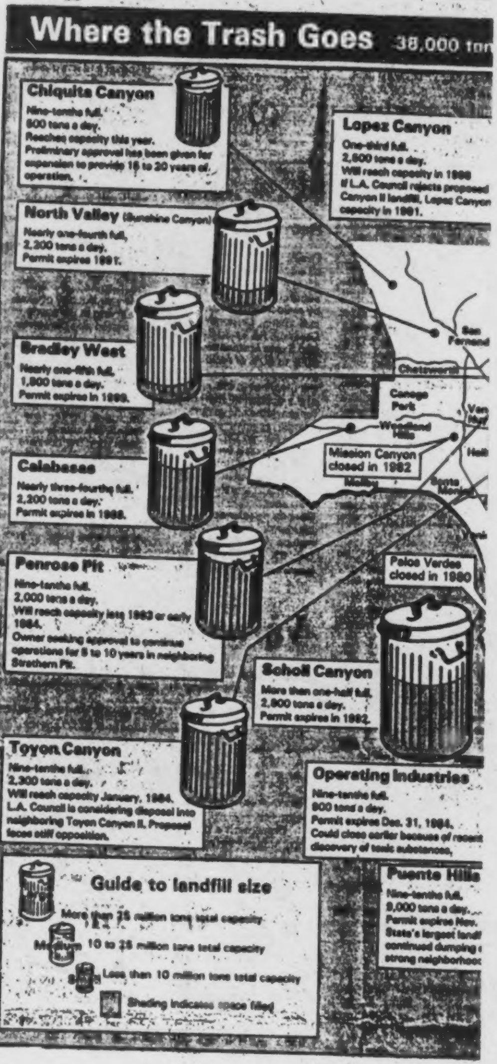
One worst-case scenario shows the county will have o room left in its landfills by the early 1990s.

No one suggests the garbage won't be picked up. At orst, officials say, the county could haul its trash 70 iles to the desert. San Francisco, for example, will soon art hauling its trash 62 miles, double the current stance, because its existing disposal site will soon ose. A result will be higher trash fees for San anciscans.

In Los Angeles the same thing is certain. Unless new expanded disposal sites are permitted near the city, sidents will pay more to have their garbage hauled nger distances. How much more will depend on the tance to the landfills and whether the daily trash load n be reduced by techniques such as recycling and ash-to-energy plants.

"We're looking at the garbage crisis as a crisis of fordability," said Steve Kolb, public information ficer for the Waste Management Board.

"Some trash in our county travels 50 or 60 miles disposal," said Walter Garrison, chief engineer and neral manager of the Los Angeles County Sanitation stricts, whose four landfills receive half the county's sh. "Doubling that distance is even more expensive d could happen if landfill sites are not allowed to ntinue to operate."



Where the Trash Goes 38,000 ton

Chiquita Canyon
Nine-tenths full.
600 tons a day.
Reaches capacity this year.
Preliminary approval has been given for expansion to provide 15 to 20 years of operation.

Lopez Canyon
One-third full.
2,600 tons a day.
Will reach capacity in 1986
if L.A. Council rejects proposed
Canyon II landfill, Lopez Canyon
capacity in 1991.

North Valley (Sunshine Canyon)
Nearly one-fourth full.
2,200 tons a day.
Permit expires 1991.

Bradley West
Nearly one-fifth full.
1,800 tons a day.
Permit expires in 1999.

Calabasas
Nearly three-fourths full.
2,200 tons a day.
Permit expires in 1988.

Penrose Pit
Nine-tenths full.
2,000 tons a day.
Will reach capacity late 1983 or early 1984.
Owner seeking approval to continue operations for 5 to 10 years in neighboring Strathern Pit.

Scholl Canyon
More than one-half full.
2,800 tons a day.
Permit expires in 1992.

Toyon Canyon
Nine-tenths full.
2,300 tons a day.
Will reach capacity January, 1984.
L.A. Council is considering disposal into neighboring Toyon Canyon II. Proposal faces stiff opposition.

Operating Industries
Nine-tenths full.
800 tons a day.
Permit expires Dec. 31, 1984.
Could close earlier because of recent
discovery of toxic substances.

Puente Hills
Nine-tenths full.
9,000 tons a day.
Permit expires Nov.
State's largest landf
continued dumping
strong neighborhoo

Guide to landfill size
More than 25 million tons total capacity
Medium 10 to 25 million tons total capacity
Small Less than 10 million tons total capacity
▨ Shading indicates space filled

When one landfill closes, the rest get more trash, filling them even faster.

neighboring canyon, dubl succeed, the city says it

‘Price’ required to assure cleanest water by 2000

By RALPH HINMAN Jr.
Staff Writer

The past-its-prime joke brought a mildly pained expression to the face of M.Roert Speach, president of a Long Beach business created largely in response to the great ecology crisis of the 1970s

"The good news," Speach heard from a visitor, no doubt for the umpteenth time, "is that by the year 2000, we'll all be drinking nothing but reclaimed water.

"The bad news is— there won't be enough to go around."

Speach's serious response might be used in providing material for an updated version of the old chestnut.

THE GOOD NEWS— in this revision— is "we have the ability right now to reclaim water for drinking purposes."

The bad... is that "not every company or community can afford" to use these new techniques, may not be able to in AD 2000.

In any case, Speach said, "The question is, how clean can we afford to be? Water can't be completely clean in an industrial nation— but we can come very close— if we're willing to make the tradeoff."

To pay the price required, in other words...

Cleaning water, reclaiming it for continuing usefulness, is a subject of deep interest to Speach, head of a company with a somewhat confusing name, Environmental Services Division of ENV, Inc.

ESD originally was a division of Ocean Sciences & Engineering, a Port of Long Beach-based firm involved in oceanography and shipbuilding. By the early 1970s, Speach proposed a spinoff from OS&E.

When an amicable parting occured, the new company took eight or nine of OSE's industrial clients with them. Today that client list has grown to about 150— and the company, while retaining "Division" in its full corporate name, no longer is subsidiary to any other organization.

ALL CLIENTS, whether bakery, industrial caterer, meat packer, edible oil producer, specialty food processor, industrial laundry, pet food processor, metal finisher or one of several other categories, share something in common. Each is a major water user, each must dispose of large quantities of water polluted by various chemicals used in business.

Once such disposal was no problem: The Pacific Ocean was both conveniently close at hand, and large.

Then came this decade's flood of ecological legislation. And a new profession, environmental engineering, along with a new Long Beach business, ESD, were born.

"All of a sudden, people cared," said Speach. A new interest in ecological matters was found in business circles, if for no other reason than many were being hurt economically by new, difficult-to-understand protective regulations.

One of these rules, perhaps little known to the general public, imposes on industry a sewer use charge based both on gallons moved and on the type of wastes carried away. Complex chemicals and other waste substances require expensive processing — here by Los Angeles County's various sanitation districts— before they may be dumped safely into a landfill or the ocean's depths.

Thousands of dollars can be spent— or saved— by industrial users. Which is where Speach comes in.

EDS, one of only a handful of waste water consultants here, monitors both the quantity and type of waste materials its clients pump into the giant industrial sewer lines.

In its role as consultant, EDS also may help its clients prepare complex paperwork required by various government agencies. Customized waste-water cleansing devices are provided. Intensive studies of the impact wastes may have on the ocean are continuing. Work sites may be on sea or land.

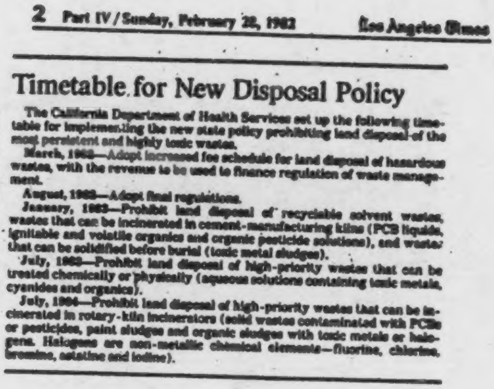
Cost effective solutions constantly are sought, said Speach. Educated as a mechanical engineer and a former aerospace executive, he turned to marine engineering and oceanography "when the need became apparent" in the 1960s.

Long Bea

M. ROBERT SPEACH
Outlines Disposal Problems

FINANCIAL

Independent Press-Telegram



2 Part IV/Sunday, February 28, 1982 Los Angeles Times

Timetable for New Disposal Policy

The California Department of Health Services set up the following timetable for implementing the new state policy prohibiting land disposal of the most persistent and highly toxic wastes.

March, 1982—Adopt increased fee schedule for land disposal of hazardous wastes, with the revenue to be used to finance regulation of waste management.

August, 1982—Adopt final regulations.

January, 1983—Prohibit land disposal of recyclable solvent wastes, wastes that can be incinerated in cement-manufacturing kilns (PCB liquids, ignitable and volatile organics and organic pesticide solutions), and wastes that can be solidified before burial (toxic metal sludges).

July, 1983—Prohibit land disposal of high-priority wastes that can be treated chemically or physically (aqueous solutions containing toxic metals, cyanides and organics).

July, 1984—Prohibit land disposal of high-priority wastes that can be incinerated in rotary-kiln incinerators (solid wastes contaminated with PCBs or pesticides, paint sludges and organic sludges with toxic metals or halogens. Halogens are non-metallic chemical elements—fluorine, chlorine, bromine, astatine and iodine).

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PLEASE ADDRESS REPLY TO MY:
☐ WASHINGTON OFFICE
☒ LONG BEACH OFFICE

Congress of the United States
House of Representatives
Washington, D.C. 20515

COMMITTEES:
PUBLIC WORKS AND TRANSPORTATION
- CHAIRMAN, AVIATION SUBCOMMITTEE
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- MEMBER, WATER RESOURCES SUBCOMMITTEE

MERCHANT MARINE AND FISHERIES
- MEMBER, FISHERIES AND WILDLIFE CONSERVATION AND THE ENVIRONMENT SUBCOMMITTEE
- MEMBER, MERCHANT MARINE SUBCOMMITTEE
- MEMBER, PANAMA CANAL SUBCOMMITTEE

- MEMBER, NATIONAL TRANSPORTATION POLICY STUDY COMMISSION
- MEMBER, PORT CAUCUS
- MEMBER SHIPBUILDING CAUCUS

April 16, 1982

M. Robert Speach, President
Enviromental Services Div.
716 West 14th Street
Long Beach, CA 90813

Bob

Dear Mr. Speach:

Thank you for visiting my office and relating to me your concerns about your proposed toxic waste treatment plant.

It seems to me that you represent an important direction in the means by which our society solves its pollution problems. That is, you represent the cooperative effort of government and society to, one, identify and provide the proper policy incentives to solve pollution problems, and then two, to actually devise the solutions to those problems.

Again, thanks for dropping by. Please let me know if there is anything I can do for you.

Sincerely,

GLENN M. ANDERSON
Member of Congress

GMA/led

Mr. Skelton. Dr. Simpson.

Dr. Simpson. Dr. MacKay, are you familiar with the concept and practice of commingling, using solids and liquids to try to immobilize liquids?

Dr. MacKay. Familiar in the sense that I understand what that term means, yes.

Dr. Simpson. All right. At BKK are you familiar with their commingling ratio?

Dr. MacKay. I understand it is two parts solid to one part liquid or, let's say, liquid hazardous waste by weight, I believe.

Dr. Simpson. Do you know how they arrived at that figure, the 2 to 1 ratio?

Dr. MacKay. No; I don't.

Dr. Simpson. What sort of testing would you require to be satisfied that that ratio or any ratio for that matter, is, in fact, sufficient to immobilize liquid waste?

Dr. MacKay. Well, I think the best evidence in this particular case, since you have a site in which it has already been done, is to look for leachate, to look for those contaminants underneath or downgradient from the landfill itself. In talking with people, as I did before I came down here, who were more knowledgeable about specific scientific concepts related to this than I am, it was suggested it would be extremely difficult to predict that particular ratio. A lot of the ideas related to moisture retention by solids are founded on the idea of capillary retention, capillaries being very, very small pores in the solid. In this particular case waste or something would be compacted, but still have voids in it and it is hard to think of a solid waste with things like refrigerators and toasters and TV's and so forth having a predominance of extremely small pores.

One of the other phenomena that I believe is important in the idea of moisture retention, especially in solid waste, is the fact that cellulosic materials, paperlike products, can absorb a lot of water, which everybody understands, but the scientific principle behind that is that there are very tiny capillaries in the cellulosic fibrils, which can expand and absorb water. They may not be able to expand and absorb by the kinds of liquids like organic solvents and so forth. So, the idea of field capacity may be somewhat limited and not generally true in its simplest form to all liquids.

Dr. Simpson. But it seems that the thing that you are recommending is that rather than relying upon any tests and theoretical analyses to instead just go out there and monitor and see what is actually leaching out.

Dr. MacKay. Well, at least as a first step, because so many sites apparently use the commingling process. We have unwittingly, perhaps, performed an awful lot of experiments and we ought to benefit from them before we run off to the laboratory to do things without any direction.

Dr. Simpson. Thank you. Dr. Perrine, can you tell us what you know of foreign advancements in alternative techniques to take care of hazardous wastes in a more appropriate fashion?

Mr. Perrine. Well, I am not really an expert on all that is going on around the world. I know that the literature tells you that it is being done everywhere. That is, this business of recovering energy is just very common and the business of recovering other valuable materials from waste, which can be toxic and hazardous, is done all the time.

Dr. SIMPSON. Do you know if there is some sort of trade of consideration going on between flaring off, say, onsite generated methane, to flare it off to get rid of odor problems, as opposed to flaring it off to generate energy, that you have to choose one or the other, but you can't do both very well?

Mr. PERRINE. You really can't do both very well. If you want energy recovery, you have to decide on that in the first place. I think that many of the systems that have been built to recover gases from landfills have been built as an afterthought. They are not really properly designed. They are just "let's do what we can to patch up a problem," and that is most unfortunate.

In that system you end up with an incineration facility which simply does destroy things so you don't get odor and, hopefully, no organic compounds coming out.

Dr. SIMPSON. There, again, it seems like some sort of monitoring program would be called for.

Mr. PERRINE. It certainly should be. If there are significant chlorinated organics, you should be looking at hydrochloric acid coming out to the air, too. It is not likely to be a real problem in this case, I hope.

Dr. SIMPSON. All right. Thank you very much.

Mr. SKELTON. Dr. Perrine, Dr. MacKay, thank you so very much. If there are no further questions, we will excuse you.

The next group of witnesses are from the BKK Landfill Corp. Would you please step forward and we will ask that you give the reporter your names? I know some of you. I don't know all of you. I would suggest that staff make identification cards for them.

Would you for the record give your name and your position with the landfill corporation, please, sir?

Mr. KAZARIAN. Yes, Mr. Chairman. My name is Ken Kazarian, and I am vice president of BKK Corp.

Mr. SKELTON. All right. Joe.

Mr. JOHNSON. My name is Joe Johnson, and I am the chief engineer for BKK Corp.

Mr. VOGEL. My name is Chuck Vogel, and I am a lawyer that performs services for the corporation.

Mr. GASTELUM. I am Ron Gastelum, the general counsel for the corporation.

Mr. SKELTON. Proceed.

TESTIMONY OF KEN KAZARIAN, VICE PRESIDENT, BKK CORP.; ACCOMPANIED BY JOE JOHNSON, CHIEF ENGINEER; CHUCK VOGEL, COUNSEL; AND RON GASTELUM, GENERAL COUNSEL, BKK CORP.

Mr. KAZARIAN. Thank you, Mr. Chairman, Congressman Torres.

We have turned in our written testimony with all the documentation requested by this committee.

For the sake of time, we would like to basically summarize our testimony and then leave the rest of the time for questions.

Mr. **Skelton**. Without objection the written testimony will be submitted as written and we will be glad to have your abbreviated version thereof.

[Mr. Kazarian's prepared statement with attachments follows:]

PREPARED STATEMENT OF KEN KAZARIAN, VICE PRESIDENT, BKK CORP.

The Subcommittee has determined that a record on the BKK Landfill and its affects on small businesses in the West Covina area would be of assistance to the work of the Subcommittee. We are pleased to cooperate. However, at the outset we believe it is important to advise the Subcommittee that the BKK Landfill is in many respects unique and not representative of hazardous waste land disposal facilities either in California or nationally.

For example, unlike most other hazardous waste facilities in California air emissions are controlled at the BKK Landfill. The prevailing method of land disposal in use in California is evaporation ponds where liquid hazardous wastes are purposefully evaporated by the sun to reduce their volume. At the BKK Landfill an extensive gas collection system is in place that is neither feasible or attempted at other Class I Landfills. The underground geology at the BKK site is also not comparable to most other sites in the country. High groundwater tables that have contributed to problems on the East Coast similarly do not exist at Class I facilities in California. There is no groundwater under the BKK Landfill and the comingling of liquid with solid waste at the Landfill assures that liquids are absorbed to prevent migration.

The issue of impact on small businesses in the surrounding community is much discussed, but until now has not been singled out for special consideration. Given the jurisdiction of this Subcommittee the focus on small business is certainly understandable. The discussion on small business impacts has previously centered on the hundreds of small businesses in the area that depend upon the Landfill for the legal disposal of their wastes. In the 34th Congressional District, for example, the approximate 200 small businesses in the first four months of 1983 generated 13,392 tons of hazardous waste which, projected for the calendar year will total approximately 40,000 plus tons. It is estimated that these businesses represent about 1,800 jobs. A list of the generators within the cities of Artesia, Baldwin Park, Norwalk, Pico Rivera, Santa Fe Springs, South El Monte, and West Covina is attached. Of course, there are many more small and large businesses that rely on the facility since it is the only permitted Class I facility located in Southern California. See attached article from "Waste Age", a NSWMA publication, which explains in more detail the history of the facility and the region's reliance on its operation.

In regard to the impact on non-user small businesses located near the facility it is important to recognize that the Landfill preceded most of these businesses. The businesses are basically service oriented; e.g., gas stations, mini-markets, and restaurants. The main access to the Landfill, Azusa Avenue, is a major thoroughfare for a variety of business and residential traffic. It is therefore understandable that small businesses would choose to locate on the highway.

The concerns that have been voiced by the small businesses on Azusa Avenue relate to traffic and the incidence of hazardous waste spills. The spills have especially caused concern because of the uncertainty of health impacts and the restriction of public access to their businesses resulting from street closure during clean-up operations.

We sincerely believe the spill problem has been overemphasized because of a basic lack of understanding of the wastes involved. Unfortunately, the current national debate over hazardous waste disposal has not contributed to a better understanding. The fact is hazardous wastes can be properly handled and spills can be minimized. We are committed to the necessary educational process and such other measures as responsible community leaders and government officials can help us identify. A more detailed summary of the company's spill response efforts is provided below. Also addressed are other issues that have been of concern to local residents and businesses.

Hazardous Waste Spills on the Highway

The hazardous waste transportation industry is regulated by both Federal and State agencies. Although the incidence of hazardous waste spills on the highway is minor (10%) compared to the incidence of spills of new product, the public is generally unaware of the difference, and certainly in the West Covina area does not appear to distinguish between waste and new product. Yet the difference is critical if one is to correctly evaluate the relative danger. Hazardous waste transported to the BKK Landfill is by definition dilute, spent, and unwanted end products. Acids, for example, are commonly in an 80-90% water solution. Yet, the public perception is that these solutions if spilled can cause explosions or poison vapor clouds. A person would certainly not want to drink or touch any of these solutions, or even mix them if incompatible, but they do not pose hazards that cannot be routinely dealt with by responsible trained people.

The Company is attempting through this forum and all others that are available to inform the public of the true risks that hazardous waste spills present. In addition, we are working closely with all responsible regulatory agencies to coordinate spill response procedures on Azusa Avenue. We have purchased a response vehicle and have fully equipped it to meet all contingencies. Our personnel have been expertly trained and are capable of responding to any hazardous waste spill that can be anticipated on Azusa Avenue.

The Subcommittee might have the impression that there have been many spills on Azusa Avenue. Actually, compared to the volume of trucks that travel this major thoroughfare the number of spills are very few, (less than one tenth of one percent). The West Covina Police Department reports that there have been 14 spills since July 15, 1981 to the present. In 1983, spills occurred on 3/25 and 4/5 but were non-hazardous. On 5/1/83 small quantities of paint sludge were spilled and on 5/4/83 approximately 2 gallons of metal sludge were spilled. On 5/19/83 a spill of a small quantity of alum mud occurred. Several other similar spills have also occurred since 1981 on other portions of Azusa Avenue not within the city limits of West Covina.

Another fact that should be realized by the Subcommittee is that spills on Azusa Avenue have basically resulted from truck operator error in closing tank valves and faulty or ill-designed truck equipment. Moreover, these problems are compounded the further transportation vehicles are required to travel to permitted facilities. It is well recognized in the region that long distance transportation poses a much greater risk of accidents than the current short distance alternative of the BKK Landifll. A broader perspective and commensurate state-wide remedial action is therefore essential if the problem is to be adequately addressed.

Highway Safety of Trucks

Experts disagree on the relative dangers posed by trucks of all types on the highways. Liquid hazardous waste transported in specially designed vacuum trucks are among the safest operated of these vehicles. Nonetheless, trucks of all types are often not maintained as well as they should be and operators like the rest of us will exceed the speed limits if not closely enforced.

This Company operates both solid waste and hazardous waste transportation vehicles. Our policy is to require all drivers to maintain a speed limit of 25 miles per hour near the Landfill, and to strictly adhere to established safety procedures. We have instituted driver training programs and have begun a program to inform all drivers of hazardous waste transportation vehicles entering the Landfill of their safety responsibilities. A copy of our driver safety handout is attached.

During inclement weather all trucks entering the Landfill pick up a certain amount of mud on their tires. The mud is not mixed with hazardous waste but is still undesireable if deposited on the highway by the trucks when they leave the Landfill. Consequently, when we do have rainy conditions we post several crews on the long driveway that provides access to the Landfill scale area to wash down the tires. The muddy water from this process is contained on site and ultimately used for dust control on dry days.

There has been some concern by local agencies that refuse vehicles may be operating at load weights above the legal maximum. Though this may be true we have seen no evidence that either weight violations or technical placarding or other vehicle violations have been the cause of vehicle accidents or waste spills. Nor is there any evidence that such violations are peculiar to the BKK Landfill. The applicable vehicle laws should nonetheless be strictly enforced and it is our understanding that this is the case.

Groundwater and Surface Run-Off

The winter of 1983 was one of the heaviest periods of rainfall in Southern California history. Throughout the winter, the Landfill has been closely monitored by the Regional Water Quality Control Board for contaminents in surface run-off from exterior slopes. All rainwater falling on the interior of the Landfill is contained on-site and collected in an area of the Landfill that is not and has not been used for disposal purposes. See the attached letter to the City of LaPuente from the Regional Board concerning surface run-off from the site.

We surveyed other landfills in the area, many of which are also located near residential communities, and discovered that the BKK Landfill was the most successful in containing surface run-off. This does not mean that we are not striving to improve surface run-off controls and leachate collection systems. Thus, we recently hired a full-time engineer to design and maintain the various air and water quality monitoring systems in place at the Landfill. We also have full-time crews available to maintain exterior slopes and take such corrective action as may be necessary.

At this point it should be noted that because the BKK Landfill is primarily a municipal waste disposal facility more personnel and equipment is maintained on-site than would normally be found at a facility that only disposes of hazardous waste. Because of the additional resources we have an added capability to make structural improvements and to respond to run-off conditions. As a result, we believe that surface run-off is well contained and that hazardous wastes are in no danger of leaving the site even under the most adverse weather conditions experienced in the region.

For more detailed information on groundwater monitoring and surface run-off controls at the site we suggest the Subcommittee contact the Regional Water Quality Control Board, the State Department of Health Services, and the Environmental Protection Agency. See also the attached reports on the secure geologic conditions underlying the site.

Air Emissions

The BKK Landfill has been closely monitored for air emissions containing hazardous constituents, and has the most effective system of containing air emissions of any hazardous waste facility in the State. Other facilities do nothing to contain air emissions. The widely used method of surface impondments or evaporation ponds, as stated above, is designed to expose waste solutions to the atmosphere in order to evaporate them. Landfills that do not involve the mixing of municipal refuse still emit hazardous airborne contaminents but because methane gas collection is not feasible in those situations the contaminents cannot be controlled. Other facilities thus rely on the fact that they are either unnoticed or remote to avoid scrutiny of their air emissions.

Recent studies by the State of air emissions from the BKK Landfill have confirmed that the emissions are controlled and that with further improvements in the gas collection system emissions can be reduced to undetectable levels. Unfortunately, the public has had no means of comparing emissions from the BKK Landfill and other hazardous waste facilities, including municipal solid waste landfills, because monitoring at other facilities is only just beginning to be undertaken. We are confident that as other facilities are subjected to the same scrutiny, the air emission control system at the BKK Landfill will be recognized as a model.

In addition to reducing the air emission of hazardous contaminents the control system has been very effective in reducing the odors that are caused by decomposing municipal refuse in the Landfill. The City of West Covina has reported that odor complaints from nearby residents have dramatically reduced from a high in 1981 of 2,406 to an expected high of 200 in 1983.

It is the Company's objective to use the methane gas that is generated by the decomposing trash to produce electric energy. Currently the gas is flared in high efficiency burners located on the Landfill. The technology exists to convert the gas to steam and generate electricity. We are in the process of designing the project and if determined to be economically feasible will proceed within 1983 to obtain the necessary state and local permits. The result could be an asset to the community and a more efficient and extensive gas collection system on the Landfill.

Treatment of Hazardous Wastes

The BKK Corporation in looking ahead at the future of hazardous waste disposal in California has made a business commitment to construct and operate new regional hazardous waste treatment facilities near the areas where the wastes are generated. This judgement is based on the decreasing availability of land disposal capacity in the state and the clear trend of government to require the use of available treatment options.

A pilot treatment program was conducted on the Landfill with cooperation of the State Department of Health Services during 1981. The success of our treatment systems demonstrated, we then launched into an accelerated design and construction program to build a full-scale operating treatment plant in San Diego County. The success of that plant is now established and we have every indication that the county views the facility as an asset to the community. See, for example, the attached editorial from Station KGTV of San Diego. A brochure illustrating our treatment program is also attached along with recent Congressional testimony by this Company on treatment technologies and current regulatory obstacles to the construction of new treatment facilities.

We believe the volume of hazardous waste that is transported to the BKK Landfill can be substantially reduced if the Company's treatment programs are successful. While there are many factors that will influence that success, including further restriction by the government of lower cost land disposal options, we are committed to providing a viable and affordable treatment option to our customers and to the community surrounding the BKK Landfill.

Conclusion

The Subcommittee specifically requested that we address five questions attached to the letter of invitation to testify at the hearing. We have done so in an attachment, but have obviously chosen to go beyond those questions in this testimony to provide a more comprehensive view of the many issues it is likely to be exposed to as it explores its small business concerns. Our purpose in doing so is to emphasize to the Subcommittee that there are many parts to the hazardous waste question and that perceived solutions to one part may conflict with solutions to other parts or even the broader overall solutions that do exist.

We appreciate this opportunity to share the perspective we have gained over many years of business. Because of this experience we are optimistic that legislators, community leaders, residents, businessmen, generators and disposers will identify economically and environmentally acceptable solutions. We urge that the Subcommittee use the testimony gained at this hearing to point the way towards the much needed consensus.*

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*Attachments referenced in this testimony have been provided to the Subcommittee only, due to their length.

Attachment to Testimony
June 3, 1983

ANSWERS TO QUESTIONS

Our activities are carried on under the name of BKK, a California Corporation incorporated on March 26, 1952.

In answer to the Subcommittee's specific questions, 1 through 3, we submit the following excerpts from our "Operations Plan", dated July 1, 1981.

The response to question number 4 is yes.

In compliance with the request in question 5, we are pleased to submit the following:

A. Report on Seismic Stability and Bedrock Permeability, Alvin L. Franks, July 16, 1981.

B. Evaluation by Pacific Soils Engineering, dated October 1, 1981.

C. Environmental Engineering Program Study, July, 1981; University of Southern California.

If we can be of further assistance to the Committee or its staff, please feel free to contact Mr. Joseph R. Johnson, head of our Engineering Department.

V. GENERAL OPERATING PROCEDURES

A. Receipt and Identification

1. Hours of Operation. The normal business hours of the BKK Sanitary Landfill are 6:00 a.m. to 5:00 p.m. six days a week. No disposal vehicles are permitted to cross the scales and no site equipment may begin work activities prior to 6:00 a.m., except in an emergency. Receipt of industrial liquids may be scheduled by an "appointment" system to ensure adequate amount of solid waste "sponge" material and soil cover are available at all times. All depositing of solid and liquid wastes is completed at least one hour before sunset to permit completion of daily cover during daylight hours. After daily closure no wastes are permitted to be delivered to the site, and no vehicles are permitted to be stored holding wastes on-site. Certain hazardous wastes may be restricted to disposal only on certain days, as previously discussed.
2. Receipt and Identification. All solid and liquid waste transport vehicles must stop at the scalehouse to be weighed to determine the tonnage and type material to be disposed. Fees are charged according to the then-current rate sheet (See Appendix D). All liquid waste transporters must submit a California Liquid Waste Hauler's Record which effective November 19, 1980, must comply with U.S.E.P.A. requirements pursuant to R.C.R.A. If the hauler's load consists of more than one generator's wastes, a properly completed manifest must be submitted for each generator totalling the hauler's load. A copy of each Record is retained at the scalehouse. A copy of a permit from the State Department of Health Services also is required for any extremely hazardous material. If the transporter does not have a proper Record the load will be rejected.

Each liquid waste transporter is questioned to obtain general information about the load. If required, the vehicle will be directed to the chemical laboratory for sampling and analysis of the waste. Any loads which contain extremely hazardous materials or are not adequately described on the manifest will be sampled, as will all "non-repetetive" loads. The BKK Chemist and Safety Engineer have established safety procedures that must be followed while sampling loads. A one quart sample is obtained either from the rear dump tube or with a "sample thief" and tested per the Lab Procedures contained in Appendix E. Samples will be retained for seven days.

After sampling, and if the load is acceptable, the vehicle operator is either directed or escorted to the appropriate disposal area (see "Color Code System" in Appendix E). The disposal area supervisor is notified by radio whenever any non-green card is placed on a vehicle. The entire disposal operation is under direct BKK supervision. In addition to the area supervisor, the escort will direct and assist operations where appropriate.

B. Control of Wastes at the Facility

1. Procedures for Disposal

At all waste disposal areas every employee and driver is required to observe all safety precautions including wearing protective clothing and equipment. Drivers are required to obey the area supervisor's instructions completely, and any person failing to do so may be denied dumping privilages. If a company fails to adequately equip and/or train its drivers a BKK Notice of Violation will be sent to the company and then it may be denied access to the landfill.

Each disposal area is supervised by a properly trained BKK employee during disposal operations. The special areas prepared for non-compatible liquids and for drum storage are clearly signed. The lab-assigned escorts are trained to ensure that all non-compatible wastes are taken to the proper area. When utilizing an appointment system, prior segregation is readily achieved so that efficient operating areas can be prepared to minimize risk and time of exposure. Each area complies with the instructions contained in the City's Fire Department letter of June 20, 1978 (Appendix F) and any special instructions given by City inspectors.

Actual disposal of hazardous wastes is accomplished at each area as follows:

a. Main liquid disposal area (LDA). Routinely accepted non-malodorous liquids(Green Card) are discharged directly into a cavity formed in the daily refuse intake and mixed with solid waste. The liquids must not exceed 33 percent by weight per City permit requirements. Odorous, toxic, flammable or other loads where exposure must be kept to a minimum (Orange Card) are discharged through a hose below the surface of previously discharged liquids. The number of liquid wastes loads which will be accepted on any given day is restricted to ensure adequate amounts of solid "sponge" material and that all loads may be discharged prior to daily closure with sufficient daylight remaining to complete cover prior to sunset.

b. Special LDA. On days that acids or cyanide wastes (Yellow Card and Red Card, respectively) are accepted, a special LDA is prepared for disposal of these wastes. After the chemical laboratory confirms compatibility with other special loads, an assistant will escort the load to the special LDA to ensure proper disposal. If used, the appointment system permits limiting the period of active disposal to reduce exposure time to a minimum. Extreme care is taken to protect all drivers and employees including extra supervision and inspection by the escort to confirm that no unexpected chemical reactions occur during disposal. The acids are comingled with solid refuse similarly to the operations at the main LDA, and the special LDA is covered with clean earth as soon as possible to limit exposure.

c. Drum Area. Drums and other small containers which are accepted for disposal (See Appendix D) are handled on pallets only and only on certain days. The generator/hauler is required to seal and label all drums, and the contents are never rehandled. Drums are fully inspected and carefully placed in a special area, segregated as to contents for compatibility, and carefully covered with fresh earth by the end of the day to prevent damage to or rupture of any container. The area supervisor inspects and directs disposal operations including verifying integrity of containers.

(PROCEDURE
DELETED IN
1981)

d. ~~Injection Wells. When utilized, individual wells are drilled into existing refuse, and strong acids and caustics (Yellow Card) are piped directly underground by gravity feed (no pressure) using valves and appurtenant equipment on the hauler's vacuum~~

~~truck. There is no exposure of wastes during the operation which is reviewed by the area supervisor. Signs also are posted with connection, disposal and disconnection instructions, and each well is clearly numbered and identified as to contents. An escort will accompany and direct the disposal operation as required. The operation is designed to prevent exposure of personnel to hazardous liquids, vapors and gasses and to ensure compatibility of injected wastes. At this time, however, injection wells have temporarily been discontinued as a means of disposal.~~ PROCEDURE DELETED IN THE YEAR OF 1981

Each of the above areas is located within a distinct and carefully recorded portion of the landfill site to ensure segregation of non-compatible wastes. Each area is hand-cleared of litter every day. Full-time grading and erosion control operations, including installation of storm drains and other drainage devices, provide continuous protection from run-on and collection and on-site reuse of runoff.

If the manifests do not provide sufficient waste load identification, the subsequent analytical identification will determine whether the waste can be admitted to the site and, if admitted, where it will be dumped.

Analyses will be performed on each waste entering the landfill for the following characteristics:

- Compatibility
- Flammability
- Toxicity
- Odor
- Explosivity
- Specific Gravity
- Temperature
- Acidity

See Appendix J for a detailed description of analyses.

C. Waste Analysis Pla:

1. Off-Site Facility.

a. Waste Analyses by Generator. Hazardous waste generators have agreed to supply manifest information such as type of waste, weight, and number count. Little more than the proper shipping name of the waste and EPA number are required to appear as a description on the manifest under Subsection 262.21, Title 40, CFR.

b. Procedures to Detect Manifest Discrepancies. In order to insure that the load matches the waste described on the manifest, the waste load is checked against the manifest inventory count and then weighed. The hauler is admitted to the landfill if the following conditions exist:

- On-site chemist and safety coordinator are confident in the safe disposal of the load

- Proper permits are submitted for hazardous loads

If these conditions are not met, then sampling is undertaken. Further visual inspection and rapid chemical analyses can be performed during sampling. Examples of waste characteristics which may be determined by further visual inspection and rapid chemical analysis include:

- Physical state of the waste - powdered or granular solids, slurries, sludges, liquids or compressed gases

- Whether liquids and slurries are primarily aqueous or organic

- pH of aqueous wastes

- Odor

- Specific gravity or density

c. Identification Procedures. If further identification is required, the waste generator might be contacted before additional testing takes place. Additional on-site identification testing procedures might include analysis for:

- Explosivity
- Hazardous chemicals present
- Gases present
- Temperatures present
    - Ambient air temperature
    - Surface temperature of tanks
    - Sample temperature
    - Temperature increases due to reaction, e.g., water reactivity reactions.

If these procedures are insufficient to properly identify each load of hazardous waste received, then the load is denied entry and directed either back to the generator or to off-site laboratories for further analysis.

d. Waste Sampling Methods. Procedures used to obtain representative waste samples are:

- Top sampling - sampling from beneath the dome lid of a tanker truck
- Rear tube sampling - sampling from a tube connected to the rear outlet of a tanker truck
- Using a sample thief - sampling from various layers of a tanker truck waste load.

For further description of the Waste Analysis Plan, see Appendix J, Part I.

e. Methods to Insure Compatibility. The methods to insure compatibility with handling methods are generally pH testing, odor evaluation, and explosivity reading. Normally the liquid wastes destined for the daily hazardous disposal area should be: a pH range of 3.0 to 14.0; odor evaluation of 0 to 2+; and an explosivity reading of less than 10 percent. However, not all chemicals that meet these requirements are compatible. Please refer to the potentially incompatible liquid waste chart in Appendix J. Additional testing methods that can also be used to insure compatibility with handling methods are listed in Part 2.B.2.c. of this section.

2. Updating of Waste Analysis Plan. Should any changes occur in regulations regarding the Waste Analysis Plan, or any changes in methods or procedures applied to laboratory analysis or sampling, the Waste Analysis Plan will be updated so that current information is always available.

Operating procedures require vehicles to be cleaned of mud and/or debris before exiting the site to keep adjacent public roads clean.

For wet-weather operations a special interior area is utilized for the main LDA. Routinely accepted asphaltic wastes (for which there is no charge for disposal) are used to provide an all-weather surface for vehicle operations. The absorption rate of the solid "sponge" material is closely monitored. Certain wastes--particularly malodorous materials--will not be accepted during wet weather; however, the southern California climate is quite benign (less than 26 days average per year with measureable precipitation) and, consequently, periods of limited operations are brief.

The entire site has been engineered to preserve the supply of existing soil and to sequence operations for optimal use of the landfill. Exhibit 3 is a typical section showing the sequence of operations over the life of the site. Every year a topographic survey is made, areas of cut and fill are analyzed and the amount of available cover material reviewed, and engineering plans for erosion control, drainage, landscaping and irrigation, and gas collection and extraction system expansion, are prepared. Plans are reviewed by the City of West Covina.

2. Environmental Controls

a. Geology/Hydrology - The Preliminary Soil Engineering and Geologic Report was prepared December 26, 1973, by Pacific Soils Engineering, Inc. (Richard Lownes, E.G. and Rex P. Ketter, R.C.E.) and is available on-site and at the corporate office in Torrance for inspection. Additional studies and reports relative to the construction of two hydraulic barriers (discussed below) were prepared by Pacific Soils Engineering, Inc. on December 10, 1974, August 5, 1975, and December 15, 1977. In response to the proposed RCRA standards for land disposal sites, Pacific Soils Engineering, Inc. reviewed the site on December 18, 1980 relative to geotechnical compliance and determined the site probably meets waiver requirements. Long-term permeability tests are scheduled during 1981. The Geologic Report is briefly summarized as follows:

> Surficial soils on the site consist of earth fill, solid waste fill, natural soil, alluvium and slope wash. Dark gray silt, sandy silt and clayey residual soils ranging from 1.5 to 3 feet in depth are found on knolls and steeper natural slopes. Alluvium underlies the lower broad areas and occupies subsidiary canyons, probably varying from 3 to 15 feet in depth. The alluvium consists of moderately stiff clayey silt and silty clay. Slope wash underlies the recent alluvium in the main canyon area and overlies the bedrock in the upper draws and lower portions of the natural slope areas. The slope wash is predominently moderately dense to dense silty to sandy and clays and silts.
>
> Late Miocente Puente Formation rocks are divided into two major units on the site: a shale and siltstone unit and an overlying sandstone and conglomerate unit. The site is underlain mainly by shale and siltstone, consisting of brown and gray clayey siltstone and platy clay shale. Occasional thin lenses of tan medium grained sandstone occur in the shale and siltstone unit. At the west end of the site, dense tan sandstone

> and conglomerate beds with occasional thin beds of shaley siltstone crop out. This material is massive, well cemented and for the most part should be no more permeable than the shales and siltstones. However, thin permeable lenses do occur as evidenced by fresh water in one boring site.
>
> From a geologic structure standpoint, the site is located on the western nose of the westerly San Jose Anticline. Bedding on the site is westerly with several small northwesterly plunging folds occuring in the central portion of the site. Several minor shear zones are in evidence, but there is no indication of recent movement. Landsliding in the form of bedding failures and shallow soil slumps has occured where slopes have been undercut by grading or stream erosion.
>
> Overall, the topography and natural materials on-site are relatively impermeable, which makes the site suitable for landfill use.

Based on the findings of the Preliminary and subsequent geologic reports, two hydraulic barriers have been built as located on Exhibit 2. Exhibit 4 is an as-built plan of Barrier No. 2 and includes a typical section through an observation well. The two man-made positive hydraulic and impervious barriers intercept perched water derived from poor quality groundwater within alluvial deposits in a portion of the site and will intercept any leachate generated within the Class I section. However, constant and intensive monitoring thru a system of nine observation and extraction wells (as located on Exhibit 2) sited both up-and downstream of the barriers has revealed no leachate generation to date. Apparently this is

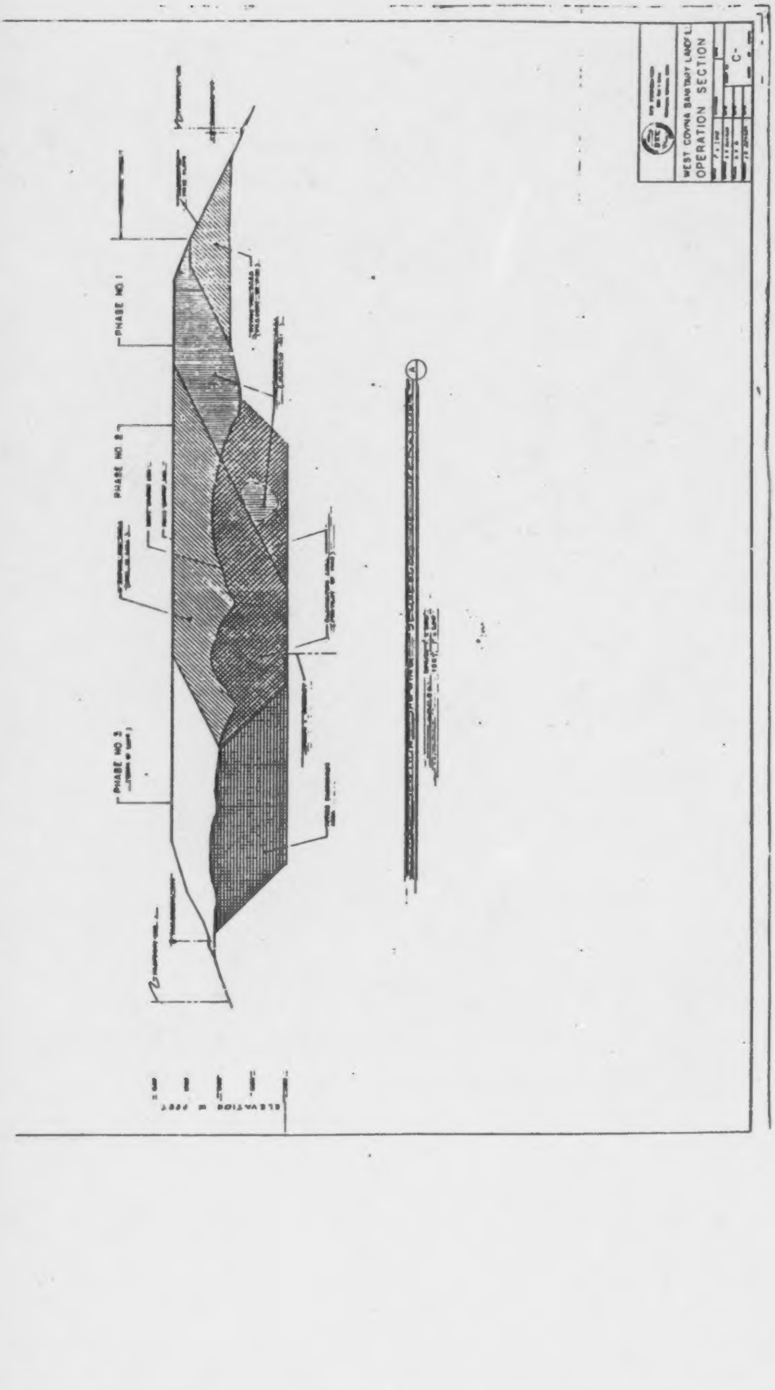

PHASE NO 1
PHASE NO 2
PHASE NO 3
ELEVATION IN FEET
WEST COVINA SANITARY LANDFILL
OPERATION SECTION
C-

EXHIBIT 3

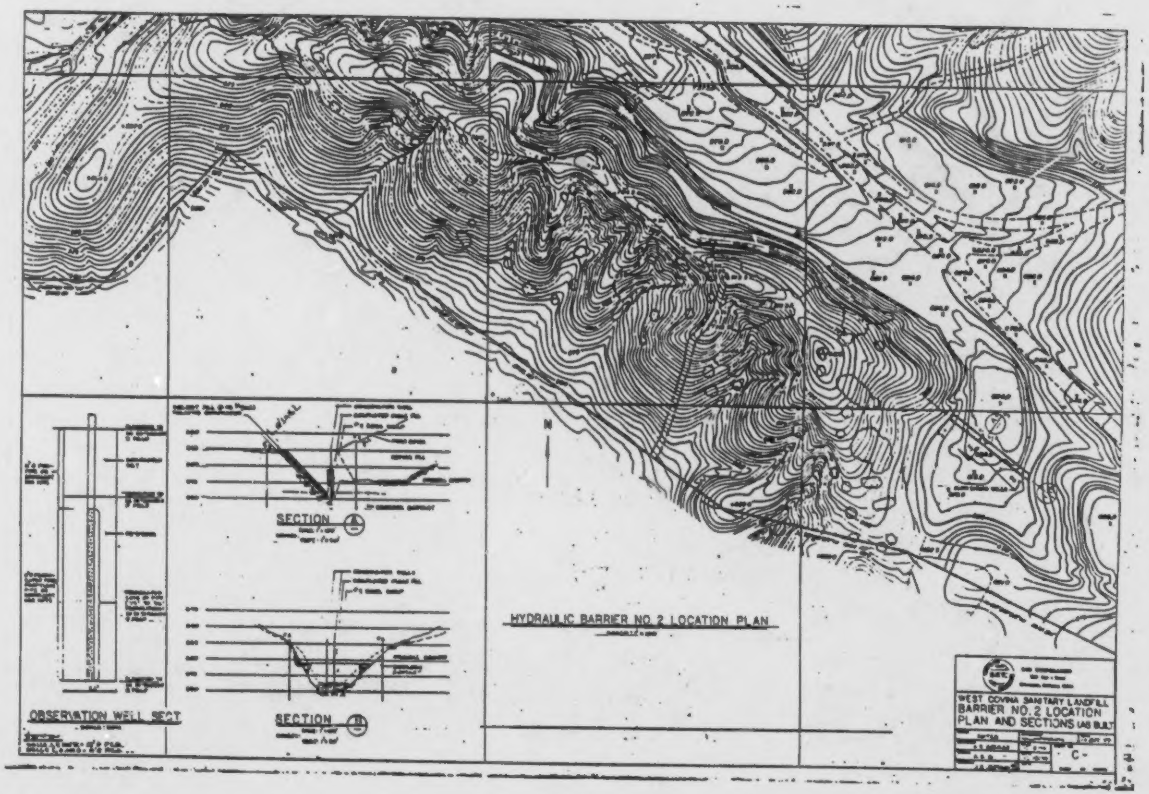

N
SECTION A
SECTION B
OBSERVATION WELL SECT
HYDRAULIC BARRIER NO. 2 LOCATION PLAN
WEST COVINA SANITARY LANDFILL
BARRIER NO. 2 LOCATION
PLAN AND SECTIONS (AS BUILT)
C-

EXHIBIT 4

due to the benign climate and limitation on the ratio of solids to free liquids disposed. However, leachate extraction systems have been constructed as a part of the barrier system and are designed to remove all leachate that may be generated. Perched water is pumped out and reused for dust control on-site; no water is permitted to be discharged downstream.

b. Groundwater Monitoring. As indicated above, water is collected at both barriers, which are located downstream of the boundary of the Class I area. This water is sampled monthly by a certified testing laboratory, and the results are reviewed by trained staff members and submitted to the City of West Covina and the Regional Water Quality Control Board. Specific monitoring requirements are contained in the Board's Revised Waste Discharge Requirements, Order No. 78-140 dated November 27, 1978. As indicated above, no degregation of downstream groundwater has occurred.

c. Gas Monitoring and Extraction. An internal system of 55 gas extraction wells has been constructed and connected to a blower/burner system to provide high-temperature combustion of all extracted gases. In the future energy may be reclaimed utilizing the methane gas as an alternate fuel source. A series of nine gas monitoring probes also is in place on the southern and eastern boundaries of the site to detect any lateral migration of gas. Both systems will be expanded, as required, during future operations.

The gas probes are tested monthly to determine the presence or absence of combustible gas originating within the landfill. The test results are routinely reported to the City of West Covina.

If gas migration is detected appropriate exhaust gas systems will be installed pursuant to plans to be approved by all responsible agencies. Such systems will be "state-of-the-art."

d. Vectors. Daily cover of all refuse has been adequate and sufficient to avoid vector problems. The heavy equipment operations discourage wildlife from entering active areas during the daytime, and no insect or rodent infestations have occurred.

e. Odor. Operational procedures and the gas extraction system have been designed to reduce odors to the greatest extent possible. On occasion deodorizing agents are used, and certain chemical loads are rejected due to odor. The cover is routinely inspected for fissures or cracking and remedial measures are immediately taken when necessary.

f. Noise. All operations conform to City and other agency noise requirements, including mufflers on all equipment. Earthen barriers block most of the landfill from nearby residences, effectively acting as noise attenuators. Operations are conducted as far as possible from existing residential areas, and only Azusa Road, a major state highway, is used for access, thereby avoiding truck travel in local neighborhoods. Hearing protectors are provided to and required to be worn by all employees exposed to high noise levels. Operations are confined to normal daylight hours.

g. Dust. Interior roadways are routinely sprayed by water trucks to control dust. Where possible, native vegetation and/or landscaping is used to control dust and erosion. Irrigation is included with all permanent landscaping. Debris fencing to control blowing litter and the earthen barriers also help to control wind-blown dust.

3. Salvage

Ferrous and non-ferrous metals, cardboard and other items are removed by hand from the dumping area prior to comingling. The salvaged material is stored in bins on-site and sold in bulk to private resource recovery operators. Removal of the materials is accomplished with the full cooperation of all operating personnel and under the control of the area supervisor. No retail sales of recovered materials are permitted on-site.

C. Inspection

BKK personnel daily inspect the internal roadways, interim cover and drainage devices. All active injection wells (currently, none) and the well area are included. Monitoring and extraction wells are inspected at least weekly. The gas combustion system, however, is inspected daily. All equipment is routinely inspected and serviced on a regular schedule and at least once a month. BKK has established a regular maintenance schedule for all vehicles based on need. Pursuant to § 265.15 of RCRA, the schedule and inspection log are maintained at the landfill office. The log will be maintained for at least three years.

Any deterioration or malfunction of equipment or facilities will be remedied on a schedule which ensures the problem does not lead to an environmental or human health hazard. If a hazard is imminent or has already occurred, remedial action will be immediate. If required, the Contingency Plan will be implemented.

IV. CONTINGENCY PLAN

The elements of the Contingency Plan shall be implemented immediately whenever there is an accident or incident which could threaten human health or the environment.

A. Response Procedures.

1. Fire In the event of a fire the following actions shall be taken as appropriate.
   a. Determine the nature, source and location of the fire and the nearest available equipment and supplies appropriate for use in responding to it. Report to the landfill office immediately.
   b. Remove all non-essential personnel and equipment upwind from the vicinity of the fire.
   c. Utilize adequately trained on-site personnel and available equipment to control and/or extinguish the fire. This includes use of fire extinguishers, water trucks and earth-moving equipment if appropriate. The cause of the fire shall be determined and corrected.
   d. The landfill office shall immediately contact the West Covina Fire Department pursuant to procedures established therewith even if on-site capabilities are deemed adequate to extinguish the fire. BKK will follow the Department's directions and cooperate fully therewith.
   e. In the event of an off-site fire (such as a brush fire) near the site BKK will lend its personnel and equipment to the City to assist the Fire Department as required.

f. If required, the Emergency Coordinator will close down all or part of the facility and implement emergency procedures.

2. Liquid Waste Spill. In the event of a spill within the Class I disposal area, the waste may be contained by earth-moving equipment and comingled with non-hazardous solid waste and/or sorbents and covered with clean earth in place. It will be recorded as having been disposed of at the location of the spill. If a spill occurs elsewhere on-site the following actions will be taken:

    a. For minor spills, the cause of the spill will be corrected and the liquid will be contained in as small an area as possible. The waste will either be mixed with sorbents or dirt and removed for disposal or vacuumed up and disposed of properly. The area of the spill will be either thoroughly cleaned (rinsed water to be disposed of properly) or covered with a minimum of one foot of clean earth. The Emergency Coodinator will inspect the area prior to resuming operations at that location.

    b. For major spills actions similar to response items a,b,c, and f for "Fire" will be taken. The major action will be to contain the spill in the smallest possible area and remove the waste as quickly as possible using vacuum trucks or other equipment as appropriate.

    c. The area of the spill will be cleaned and covered with a minimum of one foot of clean earth.

    d. Any equipment, facilities or drainage devices impacted by the spill will be decontaminated and thoroughly inspected prior to re-use.

e. If a spill could result in off-site contamination the City Fire Department will be advised immediately, and BKK will fully cooperate with the Department's instructions.

3. Release of Toxic Emmissions. It is possible that the comingling of certain waste chemicals which may not be properly identified on the California Liquid Waste Hauler's Report by the generator and not readily detectible by field test of the hauler's load, such as nitrous oxide, may occur. Certain mixtures may produce fumes which are visible. If fumes are detected, or there is any indication of the possible presence of toxic fumes, the Emergency Coordinator will cause disposal operations to cease immediately and require all personnel to remain upwind until he/she decides the environment is again clear. The composition of the loads remaining in affected vacuum trucks will be verified with the producer before any further disposal is allowed. No person will be permitted in or near the affected area without adequate safety equipment. The Emergency Coordinator will immediately assess the possible hazards to human health or the environment and implement emergency procedures if applicable.

   While excavating in areas of previously disposed waste to install gas or water wells or gas extraction pipeline, workmen may be exposed to odorous or potentially toxic fumes released by the disturbance of in-place refuse. Therefore, it is mandatory to wear respiratory protection and to be under close supervision during any such construction activity.

4. Personal Injury. Should an incident or accident result in personal injury immediate steps will be taken to determine the cause and extent of the injury and to apply first aid and/or decontamination if appropriate. The landfill office will be notified immediately, and paramedics will be called if required. If necessary the injured person will be properly transported to the appropriate medical facility. If exposure to a hazardous waste is involved a copy of the Waste Haulers Manifest together with any appropriate safety data will be sent along, and experienced personnel shall be kept available for consultation.

B. Emergency Coordinator The Landfill Manager is assigned the primary responsibility for coordinating emergency response. He/she is on call 24 hours a day by pager service. His home phone number is provided to the Corporation's 24-hour answering service. In the event that the Landfill Manager is not immediately available, alternatives are provided. All employees assigned this responsibility are thoroughly familiar with the Contingency Plan; all station operations, facilities and records; the location and characteristics of hazardous wastes handled at the station; and the phone numbers and locations of emergency response sources. The Emergency Coordinator has authority to commit all resources need to carry out this Plan. Appendix G is a current list of the personnel (in order) who may serve as Emergency Coordinator.

C. Emergency Procedures.

1. Assessment of Hazard. For each incident the Emergency Coordinator will take the actions described in Part VII A. If he determines there is a potential for off-site injury or environmental damage the Emergency Coordinator will immediately notify appropriate local authorities and emergency treatment facilities. In the extremely unlikely event his assessment indicates evacuation of an area is required, he will immediately notify the designated government official or the National Response Center pursuant to RCRA. He will remain available to help appropriate authorities.

2. Employee Evacuation. All personnel will be alerted via the two-way radio system if an accident or incident occurs. Employees will be advised immediately if evacuation is required and directed to leave in an up-wind direction (west to Azusa Avenue, east to unimproved corporate-owned land, or north into the park or residential

area. The Emergency Coordinator will insure the appropriate gate is unlocked and resecured as required. Non-corporate personnel will be directed by responsible employees. Local agencies and emergency treatment facilities will be notified immediately if a potential for injury occurs.

3. Arrangement with Local Authorities. All affected local agencies and emergency services are being provided the Contingency Plan, including the facility layout and types and characteristics of wastes handled. Upon their recommendation, BKK Corporation will implement any procedures requested to minimize hazards and revise the Contingency Plan accordingly. The low accident potential and facility layout are such that additional extensive emergency arrangements are not required, and the affected agencies can handle incidents through normal response channels.

4. Facility Shut-down and Monitoring. If required, the Emergency Coordinator will cease operations at all or part of the site. He will monitor affected facilities and immediately arrange for decontamination of equipment and/or storage or disposal of wastes and contaminated water and soil. Operations will not resume until affected equipment has been inspected and approved for use and clean-up of affected areas is completed. Also, all emergency equipment (detailed in Part IV) will be inspected and cleaned or replaced as required prior to resumption of operations.

5. Notification. The Emergency Coordinator will prepare written reports as required by all regulatory or local agencies and will note in detail all incidents in the Log Book/Operating Record. In particular, he will notify the Regional Administrator in Compliance with RCRA Section 265.65.

6. Amendment of Contingency Plan. The Plan will be reviewed and immediately revised upon substantive change in design, processes or equipment or personnel or upon receipt of recommended changes from appropriate agencies. All affected agencies and emergency facilities will be provided the revised Plan immediately.

D. Distribution of the Contingency Plan. A copy of the Plan is maintained at the landfill office, the scalehouse and at the corporate headquaters in Torrance. Copies will be distributed to:

1. City of West Covina: Fire Department, Police Department, Planning Department.
2. County of Los Angeles: Solid Waste Management Board, Engineer-Facilities (Sanitation Division).
3. State of California: South Coast Regional Water Quality Control Board, Air Quality Management District, Department of Health Service.
4. Federal: A copy of the Plan will be submitted to the U.S.E.P.A. coincident with the Part B of the Permit Application pursuant to RCRA.
5. Copies will be provided to the emergency treatment facilities listed in Part IV C.1.

VIII. ENVIRONMENTAL CONTROL PERMITS:

The following Permits are applicable for the landfill site. Copies are maintained at both the landfill office and corporate headquarters and are available for inspection by responsible regulatory agencies.

1. City of West Covina Unclassified Use Permit No. 71. Revision 5 (Amendment).
2. Regional Water Quality Control Board, Los Angeles Region, Order No. 78-140, Waste Discharge Requirements.
3. State Department of Health Services Interim Status Document No. CAD067786749.
4. State Solid Waste Management Board Permit No. 19AF001
5. Air Quality Management District-incidental permits for various equipment. [The District does not issue a permit for landfill operations per se.]
6. U.S.E.P.A. - I.D. No. CAD067786749, Part A. Application submitted pursuant to RCRA. Part B. Application to be submitted as required by RCRA upon request. It is noted that California has obtain authorization to implement Phase I pursuant to RCRA and, consequently, the previously listed State Interim Status Document is the controlling permit.

ALVIN L. FRANKS, Ph.D.
ENGINEERING/ENVIRONMENTAL GEOLOGY
CONSULTANT
44 LAKESHORE CIRCLE
SACRAMENTO, CALIFORNIA 95831

PHONE (916) 422-2841

RECEIVED
JUL 20 1981

July 16, 1981

Mr. Joseph R. Johnson
B.K.K. Cororation
2550 237th Street
Torrance, CA 90505

Dear Mr. Johnson:

The attached report on Seismic Stability and Bed Rock Permeability at the B.K.K. Class I Site in West Covina, California has been prepared for submission to the Los Angeles Regional Water Quality Control Board.

The pump in permeability test using an inflatable packer was used to determine in place permeability of the materials below both containment dams. The results show that there were no open fractures or primary permeability in these materials.

Both dams were constructed on unweathered bed rock with two to one slopes. They were then buried in compacted soil to increase the stability. This type of construction negates any possibility of slope or foundation failure due to acceleration from seismic events. Detailed geologic mapping and exploration at the dam sites did not reveal any active faulting.

Sincerely,

Alvin L Franks

Alvin L. Franks
CEG 88

ALF:pg

SEISMIC STABILITY AND BED ROCK PERMEABILITY AT THE B.K.K. CLASS I SITE IN WEST COVINA, CALIFORNIA

Site Geology

The 583 acre disposal site is located on the western nose of the westerly plunging San Jose anticline. The formations at the site consist of the clayey siltstones, shales and cemented sandstones of the Soquel member of the mid to late Miocene Puente formation. There is an overlying sandstone and conglomerate unit located about 650 feet downstream from containment dam No. I. In general the materials consist of brown to gray, clayey siltstone and platey shale. There are occasional partings and thin lenses of tan, medium grained, cemented sandstone.

Bedding on the site is generally westerly with several small northwesterly plunging folds superimposed on the San Jose anticline. Several shear zones were found in the Puente formation. No evidence was found to indicate recent movement or that there will be any during the life of the site. There are a few landslides in the form of bedding plane failure and shallow soil slumps. These occurred where slopes had been undercut by construction or by running water.

The shales and siltstones are deeply weathered. There is a residual soil ranging from ½ to 3 feet on the hills and the steeper natural slopes with up to 15 feet of soils in the valleys. This is underlain by up to 30 feet of weathered material with some fractures extending up to 60 feet below the surface.

Geohydrology

In general the weathered zone in the Soquel member of the Puente formation contains minor amounts of poor quality water with about 2600 to 2800 mg/l total dissolved solids. It is found near the surface as perched water derived from deep penetration of precipitation and runoff. There is also minor amounts of the same quality water found in the fracture zones as previously described. This secondary fracture permeability is the same as that found at 35 feet and 60 feet below containment dam No. I.

Data collected during exploration of the site by Pacific Soils Engineering, Inc. showed that the shales, siltstones, and sandstones of the Soquel member below the dam sites were nonwater-bearing except in the weathered and fractured zones as previously described. The material was found to be dry except in these zones at all locations including below the perched water in the weathered zone. This would indicate that the minor amount of perched water flowing through the weathered zone has not moved downward through these dry materials or laterally from the fractured zones.

The State of California Department of Water Resources "Planned Utilization of Ground Water Basins, San Gabriel Valley" Appendix A Geohydrology, Bulletin No. 104-2 states that this portion of the San Jose Hills is nonwaterbearing and is considered a portion of the "non-waterbearing rocks". There are no aquifers below the site. No wells have ever been drilled on the site for the production of water for drinking water purposes.

Construction History

The original geologic study for the disposal area was done in June 1963 by Moore and Taber. This study and the additional geologic reports were reviewed by the California Department of Water Resources for the Los Angeles Regional Quality Control Board. Based on this review and after hearings, discharge requirements were issued in 1963. In 1968 additional studies were made for use of the site for the disposal of toxic wastes. Based on these studies, and again after review, new requirements were established. These included the construction of an engineered dam and a downstream system of monitoring wells. The keyway for the dam was cut 4 feet into unweathered siltstone and shale. The dam was constructed of clay materials, compacted to form an impermeable structure. In early 1972 the monitoring system began to show that the waste was getting past the dam. Exploration borings determined that the waste was passing below the dam at the interface between the clay core and the unweathered material in the core trench. A positive hydraulic barrier was constructed downstream from the dam to intercept the water for recycling back to the disposal area.

In early 1973 the B.K.K. Corporation proposed expansion of the Class I portion of the site to provide for additional capacity and life. A detailed site investigation was made by Pioneer Consultants and a report prepared for the review of all interested agencies and the public. Based on these studies a containment dam was designed for construction near the westerly contact of the shale-siltstone and conglomerate.

During construction of the core trench, it was found that the weathered and fractured zone was much deeper than the original borings indicated. Additional borings were made and it was found that there were some fractures extending to 60 feet below the surface. The design of the dam was modified to incorporate the core trench as the positive hydraulic barrier. It was located downstream from the containment dam designed and constructed to seal off both weathered and fractured materials. Construction of this dam was completed in 1974. Containment dam No. 2 is located on the south side of the site in a low swale. It was constructed in 1980. There were no problems and it was constructed as planned.

Perched water of poor quality as previously described was found at both dam sites in the weathered material above bedrock. It has been contained as follows:

> At dam No. 1 a triple row, 70 feet deep, chemical grout curtain was constructed upstream from the previously described hydraulic barrier. The surface was then scarified and a low permeability clay dam constructed on top of the curtain. An extraction well was also constructed in the weathered zone upstream from the grout curtain/dam. This well is used to monitor the water quality and water level to prevent a large head buildup on the grout curtain.
>
> Dam No. 2 was keyed into unweathered shale and siltstone. It was constructed of low permeability clay and has a positive hydraulic barrier located between the dam and the disposal area. Any fluid reaching the collection system will be recycled back to the disposal site.

Monitoring wells have been constructed at both locations as required by the Regional Water Quality Control Board. To date there has been no detection of any waste material at either location.

Seismic Stability Containment Structures

A detailed geologic investigation of the disposal area indicates that there is no active faulting on the site. The only faults observed were post Miocene faulting that occurred during uplift of the area with no evidence of displacement in younger rocks. In general vicinity of the site, major fault systems include the Whittier fault, the Norwalk fault, the Raymond fault, and the Newport-Inglewood fault system. There are numerous other active faults more distant from the site. One, the San Andreas fault, located to the north has a maximum credible earthquake probability of 8.5 on the Richter scale. The probable effective bedrock acceleration due to movement on this fault, at the site, would be about 0.13 (Special Publication October 1973, Association of Engineering Geologists "Geology, Seismicity, and Environmental Impact").

Liquefaction caused by earthquake-induced ground shaking is most likely to occur in the soils having a low density and narrow grain size distribution. Fine-grained sands and silty sands are more prone to liquefaction than either finer or coarser materials. Areas characterized by shallow, local water table in these materials and severe ground shaking potential, typically exhibit higher than average liquefaction potential.

All of the alluvial material and weathered bedrock were removed prior to placement of the cutoff trench for both containment dams. Based on this construction practice, there is no chance for liquefaction of the foundation beneath either dam.

Earthquake damage depends on the type of structure, foundation and subsurface conditions. Weaker and less rigid subsoils magnify the amptitude of the seismic vibrations and for the majority of structures damage is increased in soft subsoils. Maximum damage occurs on unconsolidated fills.

Both dams were constructed on unweathered shales and silt stones of the Puente formation. They were constructed with 2 to 1 slopes and then buried in native material to increase the stability. This type of construction negates any possibility of slope or foundation failure due to acceleration from any seismic event regardless of ground acceleration at the site.

Permeability Testing

As previously described, there are three types of permeability found in the shale, siltstone, and cemented sandstone portion of the Puente formation. They are as follows:

- permeability in the weathered zone, residual soils, slope wash, and alluvium derived from the weathered rocks
- secondary permeability in the fracture zones in the unweathered bedrock
- permeability of the unweathered, unfractured bedrock

Measurement of the permeability of the weathered material and the fractured rock do not have to be measured since they must be modified or removed to provide for containment of fluid. The horizontal movement of waste from the site has been controlled by construction of clay dams and a grout curtain.

The single packer injection pressure method was selected to determine the in place permeability of the unweathered, unfractured bedrock underneath the containment structures. Two tests were run beneath containment dam No. 1 and one test beneath containment dam No. 2. It was believed that two tests in the nearly vertical east west striking beds at containment dam No. 1 would be required to provide a reasonable representative sampling of the material. It was felt that one sample in the less steeply southerly dipping materials at dam No. 2 would provide a reasonable representation of the permeability of these materials. Pacific Soils Engineering, Inc. of Irvine, California drilled the test holes and performed the packer tests. A copy of their report setting forth field testing results and well logs is attached.

- Test Procedures

The method for determination of in place permeability, using a packer, is similar to a falling head permeometer test. A small diameter hole is drilled with a core barrel or other system that minimize fracturing of the rock. An inflatable packer is then attached to a 3/4" galvanized water pipe and an airline. The entire assembly is then lowered to the bottom of the bore hole. Water is pumped through the packer by means of the 3/4" pipe to flush out the hole. It is flushed until return water is relatively clear. At that time the packer is lifted slowly while pumping water up to the top of the test area (5 feet from the bottom). The water is then turned off and the packer inflated to about 25 psi (pounds per square inch) of pressure above the hydrostatic head of the water table. This pressure is extremely critical. If there is not sufficient pressure on the packer, it would not be possible to pump water under pressure into the testing section. If too much pressure is used on the packer, it is entirely probable that the bore hole seal could be broken by fracturing rock (hydrofracture pressure) or actual bursting of the packer which has limited expansion capabilities.

After the packer has been inplaced and expanded, water is pumped down the 3/4 inch conductor pipe at constant gauge pressure while taking readings on a meter calibrated to measure in 0.01 gallons. Usually readings are taken at 1 min. intervals and compared to the previous minute. In most instances after about five minutes of pumping, the take of water becomes constant. Common test pressures for single packer systems are 5 psi, 10 psi, and 15 psi. If there has been a take of water during the test procedure, it is usually effective to return to 10 psi, then to 5 psi, pumping at each pressure level until the take is approximately constant to confirm the original testing. The permeability (K) is then calculated using the following equation:

$$K = \frac{Q}{(2\pi l + \pi r)h} \ln \frac{l}{r}$$

Where:

Q = stabilized flow in cubic feet per minute
l = length of permeability test below packer
h = hydraulic head in feet (pressure during test + distance from water table to pressure gauge)
r = radius of test hole in feet
K = permeability in feet per minute

The quantity of water entering the system and the length of permeability test are quite easy to measure. The radius of the hole is assumed to be one half the outer diameter of the drill teeth on core barrel or bit that was used. The fluid test pressure (h) consists of the pressure on the gauge that is provided by the pump, the head of water above the regional water table to the pressure gauge, less the friction loss in the conductor pipe which is subtracted from the gauge pressure. The friction loss can be ignored unless there is substantial take of water. If this occurs, it is necessary to conduct flow rate test on the pipe and evaluate head loss through the pipe by a calibration test.

- Test Results

Permeability Test No. 1 was run near the center line of barrier

No. 1, immediately downstream from the toe of the buried dam. The location, well logs, and details of installation and operation of the packer test are set forth in the attached July 1, 1981 report by Pacific Soils Engineering, Inc.

During installation of the packer assembly, the 3/4" water line was fastened to the fresh water pump on the drill rig. After water was flushed through the test section to wash out drilling mud, the water line was disconnected and the water level stabilized inside the 3/4" line with groundwater formation. The meter and pressure control assembly was then fastened to the top of the 3/4" pipe located about five feet above original ground and 15 feet above the water table. This air was not displaced prior to making the connection with the flow meter. This resulted in the air compression reported in Pacific Soils Engineering's report.

The positive displacement measuring gauge recorded flows to 0.01 gallons. This was accomplished by a rotor on the gauge that could be observed and flows estimated to the nearest .00125 gallons (1/8 of a revolution). After stabilization on Test No. 1, this rotor did not move, indicating less than 0.00125 gallons of flow during the twenty minute test at 15 psi. Using the following dimensions for the permeometer test and assuming that the rotor turned 1/8 of a revolution, the permeability of the shale would be 1.8 times 10^{-8} ft/min (feet per minute) or 7 times 10^{-9} cm/sec (centimeters per second).

Q = less than 0.00125 gallons in 20 minutes
$l = 5$ ft.
$r = 0.125$ feet
$h = 44.87$ feet

The packer permeability test No. 2 was installed downstream from Dam No. 1 near the north abutement as shown in Pacific Soils Engineering's report. The area tested was below the grout curtain depth. After initial compression of air in the 3/4 inch water line, there was no movement of the 0.01 gallon rotor until failure of the packer at 14 psi during the last test. The failure of the packer was probably due to variations in the drill hole through this vertically bedded material. When excess pressure was applied below the packer, water was forced along a bedding plane ridge in the drill hole that could not be sealed because of lack of flexibility of the rubber in the packer. The calculated results at 10 psi again indicated no flow of water into formation during the test period.

Permeability Test No. 3 was run in a bore hole located south of Dam No. 2 as shown in Pacific Soils Engineering's report. A packer was set above a series of interbedded shales, fine sandstone, poorly sorted pebble conglomerate and mud stones, dipping about 40 degrees to the south. The core recovered from the test zone between 77.5 and 85 ft. below the surface was 45 inches long (50% recovery). It was believed that the 5 inches of poorly sorted pebble conglomerate, 2 inch of fine sandstone and 20 inches of interbedded shales and fine sandstone would represent the more pervious type of rock. These materials would represent the more granular materials in the Puente formation at the site.

Using the following measurements of the flow and again assuming that the flow was at the minimum measurable amount, the permeability at this location was found to be less than 1.2×10^{-8} ft/min or 5×10^{-9} cm/sec.

Q = less than 0.00125 gallons in 15 minutes
l = 5 ft
h = 15 pounds per square inch, plus 55 ft
r = 0.125 ft

Conclusions

The pump in permeability test using inflatable packers is a standard test method for determination of in-place permeability of materials. Testing procedures as described in the Pacific Soils Engineering Report was developed for determination of permeability of materials having much faster permeability than the shales and cemented sandstones of the Puente formation. Usually readings are not taken on a flow meter until after about five minutes of pumping when the water take is assumed to be uniform. In all three tests, run below the weathered zone, at the BKK Disposal Site, there was no measurable take of water at the highest pressures tested for periods of 15 to 20 minutes. If it is assumed that there was an 1/8 rotation of the 0.01 gallon measuring device, permeabilities at all locations were less than 7×10^{-9} cm/sec. If the actual readings are taken, the permeability is zero.

Based on the results of the permeability testing below the grout curtain at Dam No. 1, there are no open fractures in the shale to permit flow of water below the containment system. The in-place material has a permeability of less than 7×10^{-9} cm/sec and approaching 0.

The permeability test in the layered materials at containment Dam No. 2 indicates that there is no leakage below the positive hydraulic barrier. The test showed that cemented conglomerates and sandstones of the Puente formation are impervious to the flow of water. The test also proved that there was no flow along bedding planes between the various rock types.

It can be concluded that the unweathered, unfractured Puente shales pebble conglomerate, and sandstones beneath the two containment dams are non-water bearing and do not transmit fluid. As long as the two hydraulic barriers are maintained to prevent flow through them, there will be no movement of water off site below the containment structures.

PACIFIC SOILS ENGINEERING, INC.
17909 FITCH, IRVINE, CALIFORNIA 92714
TELEPHONE: (714) 557-9450

L.A. COUNTY OFFICE
1402 W. 240th Street
Harbor City, Ca. 90710
(213) 325-7272 or 775-6771

BKK Corporation
2550 237th Street
Torrance, CA 90505

July 1, 1981
Work Order 100098D

Attention: Mr. Joseph R. Johnson
Vice President, Engineering

Subject: Pump-In Permeability Test Procedures and Results, Positive Hydraulic Barrier Systems 1 and 2, 583 Acre Planned Sanitary Landfill, 2210 Azusa Avenue, West Covina, California.

Gentlemen:

Presented herein is a summary of pump-in permeability test procedures and results for the subject site. The tests were performed during a five day period from June 15, 1981 to June 19, 1981. The purpose of the tests was to determine permeability of in-place soils below the effective depth of the subject hydraulic barrier systems.

Test levels in the borings are below the grout curtain in barrier No. 1 and below the extraction trench elevation of barrier No. 2.

A log of the permeability test borings is appended to this report. Boring locations are shown on the enclosed plans, Plates B-1 and B-2.

The permeability test zones were, Boring No. 1, 87'-8'' to 92'-8", Boring No. 2, 80'-9'' to 85'-9" and Boring No. 3, 80'-0" to 85'-0".

The test section for each of the three borings was five feet measured from the bottom of the packer to the bottom of the boring. Boring No. 1 has extremely expansive shales with the expansion affect amplified due to the near vertical inclination of bedding. For this reason, the original 85 foot hole would not accept the packer below the flight auger depth of 57 feet. The flight auger was then extended to 87 feet to hold the hole open. The last seven feet were cored with a split barrel sampler. This procedure was followed for the remaining two borings to avoid similar problems. Piezometric surfaces in the borings were; Boring No. 1 at 10 ft. 3 in.; Boring No. 2 at 11 ft. 6 in.; Boring No. 3 at 55 ft. In each boring, three separate tests were run. The first test was performed at 5 psi pressure applied to the test section for five minutes; the second test at 10 psi for 10 minutes; and finally at 15 psi for 15 minutes. In general, the gauge test results indicated initial flow, then stabilization in approximately the first 30 seconds of the test period, the result of compression of air in the lines.

Test conditions and results are as follows:

Packer Boring #1

5 psi for 5 minutes - Packer Inflation Pressure 70 psi

Gauge indicated no change or flow during test period

Packer Boring #1 cont.

10 psi for 10 minutes - Packer Inflation Pressure 70 psi

Gauge indicated flow of .02 gallons at 8 psi and .04 gallons at 10 psi due to compression of air in packer lines. Gauge reading then stabilized with no flow recorded during test period.

15 psi for 20 minutes

Initial flow (first 10 seconds) of .08 gallons was indicated due to compression of air in packer lines. Gauge reading stabilized with no flow indicated for the first 15 minutes of the test. Gauge was fluctuating due to the air in the packer lines. The packer seal broke at 20 minutes when the pressure fluctuated to 23 psi. Water rise in boring was immediately revealed by Piezometer sensor.

Packer Boring #2

5 psi for 5 minutes - Packer Inflation Pressure 70 psi

Initial meter reading = 17.04 gallons

Initial flow of .26 gallons was recorded in the first 10 seconds of test to 17.3 gallons, caused by compression of air in the packer lines. Gauge reading stabilized with no flow recorded during test period.

10 psi for 10 minutes - Packer Inflation Pressure 75 psi

Initial gauge reading = 17.0 gallons

Packer Boring #2 cont.

Flow gauge registered .4 gallons flow in the first 10 seconds, due to compression of air in the packer lines. Gauge remained steady for 8 minutes then indicated reverse flow to 17.28 gallons. Pressure remained constant. Gauge reading then stabilized with no flow recorded during remainder of test period.

15 psi for 15 minutes - Packer Inflation Pressure 75 psi

As test pressure was being increased, the packer seal failed at 14 psi. The packer was then lowered one foot and the packer pressure increased to 80 psi to attempt reseating. The packer seal failed again at 14 psi. Increased packer inflation pressure to 85 psi and seal failed again at 14 psi.

PERMEABILITY TEST #3

5 psi for 5 minutes - Packer Inflation Pressure 72 psi

Initial gauge reading = 23.62 gallons

The first 10 seconds gauge reading stabilized after reverse flow to 23.2 gallons. There was no flow recorded for the remainder of the test period.

10 psi for 10 minutes - Packer Inflation Pressure 77 psi

Initial gauge reading = 23.1 gallons

PERMEABILITY TEST #3 cont.

Flow was indicated to 23.5 gallons in the first 10 seconds of the test. Gauge reading then stabilized with no flow recorded for the remainder of the 10 minute test period.

15 psi for 15 minutes - Packer Inflation Pressure 82 psi

Initial gauge reading = 23.3 gallons

Gauge indicated flow to 24.5 gallons in the first 10 seconds of the test. Gauge reading stabilized with no flow during the remainder of the test period.

The attached log of packer borings is based solely on our visual classification of materials recovered, in standard penetration tips and core barrels, during the course of drilling. Laboratory testing of recovered materials was not regarded as pertinent to this investigation. This report is subject to review by the controlling authorities for the project.

Respectfully submitted,
PACIFIC SOILS ENGINEERING, INC.

By:
RICHARD E. LOWNES, E.G. 108
Vice President

By: Rex P. Ketter
REX P. KETTER, R.C.E. 15251
Executive Vice President

REL:RPK/ch

Dist: (12) Addressee
(2) Alvin L. Franks

Work Order 100098D
Excavated 6/15/81
Logged by H.Taube
Equipment: Continuous Hollow Stern Flight Auger/3" Diameter Core

LOG OF PACKER BORINGS

Boring No.	Depth (ft.)	Description	Samples Type	Samples Depth	Samples Blows
1	0.0-10.0	Light tan, clayey sand, fine-grained, dry			
(elev. 552 ft.±)	10.0-20.0	Lean clay, moist, mixed with fine to medium sand			
	20.0-25.0	S#100* - Clayey sand with some pebbles on bottom, medium to coarse, dark cuttings (shales?)	SP**	25.0	3/3/3
	25.0-30.0	Saturated at 25.0 ft., dark gray clay, piezometer surface @ 11-ft.,6-in.; ± 28.0 ft. dark gray silty sand with clay, poorly sorted			
	30.0-35.0	Dark gray cuttings, adding water			
	35.0-40.0	Dark gray cuttings with shale (?) cuttings			
	40.0-54.0	S#101 - Shales with vertical bedding, started core drilling, #10 impregnated bit	SP**	44.0	16/22/24
	54.0-57.0	Black and gray shales, vertical bedding, looks fractured	2 3/4" core,	54.0-57.0	no recovery

* S#100 - Sample No. 100, etc.
** Standard Penetrometer

1 cont.	57.0-61.0	Fractured dark gray to medium gray shales, fractured vertical bedding; sample S#102 very expansive	2 3/4" core	57.0-61.0, recovery 3'
	61.0-64.0	Changed to carbide bit; also changed to lighter cuttings. #S103A diagonal shear fractures. Calcite deposited on fracture surfaces. Very hard dark gray mudstone with calcite cement, dry. Began use of split core barrel	core	recovery 2 1/2
	64.0-69.0	S#103B - hard dark gray mud stone, same as #103A. Of total 5 ft. core only 8" recovered	core	64.0-69.0, 8" recovery
	69.0-71.0	S#103C - poorly sorted, siltstone size grains, wet, soft, dark gray	core	recovery 1'
	71.0-74.0	S#103D - high water loss due to fractures between 64.0-69.0, 8-inches of core recovered. Clayey shale, fractured, loose, dark gray shows slip surfaces on fracture cuttings of harder mudstone, dry	core	recovery 1 1/2
	74.0-76.0	S#103E - hard shale, dark gray, interbedded thin black vertical beds, dry, very tight	core	74.0-76.0
	76.0-79.0	S#103F - bedding approx. vertical. Very hard, dark gray-green with alternating thin black shales, moist, possible fractures	core	recovery 2'

1 cont.	79.0-85.0	Dark gray shale with light tan siltstone inclusions. S#103G approximately vertical bedding. Moist. Placed packer. Hole swelled shut at approx. 57 feet. Began redrilling with continuous flight auger from 55.0 ft. To 83.4' ft., then cored additional 7.0 ft. Shutdown until 6/17/81.	core	recovery 3'
	83'4"	6/17/81 Piezometric surface stable at 10'3". Began core drilling.		
	83'4"-92'8"	Total depth of boring 92'9" from surface. Emplaced packer, hole swelled in again. Very expansive shales, due to vertical bedding. Jetted boring with packer in placed until clean water was recovered. Raised packer 5.0 ft. from bottom of boring. Ran test.		
2	0.0-15.0	Silty clay, moist at 11 ft., dark gray, tight fill. Began adding drilling water at 15.0 ft.		
	15.0-25.0	Fine cuttings recovered with drilling water. High clay content.		
	25.0-30.0	Silty clay, moist, dark gray. Consistent drilling speed.		
	30.0-35.0	Hard material at approximately 34.0 ft.		
	35.0-40.0	@ 38.0 cuttings changed color to dark gray-green		
	40.0-65.0	Dark gray-green drill cuttings, constant drilling speed.		

2-cont	65.0-70.0	Very slow drilling - engine stopped due to binding material; loosing water, equipment down. Pulled out three augers, shut down until 6/18/81. New starting depth 55 ft. with 3.0 ft. plug in bottom of flight auger.	
	6/18/81	Piezometric surface @ 11'6". Replaced auger extracted 6/17/81.	
	70.0-77.0	Green-gray mud, slow drilling, auger flights are binding almost to a stop.	
	77.0-85.0	Began core drilling with carbide bit. Sample #200A,B,C approximately 3 ft. plug in bottom of flight auger.	No recovery
		Total depth from ground 85'9". Emplaced packer. Piezometric surface at 13'9". Ran test.	

- -

Boring No. 3 elev. 629±	0.0-5.0	6/19/81. Fine sand with gravel.
	5.0-10.0	Moist at approximately 10.0 ft.
	10.0-15.0	Approximately 12-13.0 ft. of sandy clay, dark brown, very firm.
	15.0-30.0	Very dense dark gray clay, contains some coarse sand. At approximately 28 ft. color change to light gray.
	30.0-35.0	Gray clay with small amount of very fine sand and gravel.
	35.0-40.0	Gray clay, some fine sand, gravel; contains more moisture.
	40.0-45.0	Brown clayey sand, wet with gravel and cobble size clasts.
	45.0-50.0	Brown, sandy clay (sand is fine to coarse).

3-cont.	50.0-65.0	Brown, sandy clay	
	65.0-70.0	Material is still dark brown sandy clay. Very wet, stopped drilling to measure piezometric surface. Piezometric surface @ 55 ft.	
	70.0-75.0	Began adding drilling water	
	75.0-77.5	Light green-tan recovery	
	77.5-85.0	Began coring at approximately 80 ft. dark green-gray recovery. Cuttings are very dark gray-green shale. Total Depth 85.0 ft.	core 77.5-85.0 recovery 45"

S#300A:

1" Mudstone, light gray with tan weathering, horizontal bedding

5" Poorly sorted pebble conglomerate, horizontal

2" Fine sandstone, light tan, bedding attitude approximately 40°

8" Shales, thin black and gray beds with small fine sand lens in some of the darker beds. Attitude approximately 40°

9" Very hard, well consolidated shales, dark gray to light gray to almost white. Shales interbedded with thin light gray siltstones. Dip approximately 40°

20" Shales with clay, plastic interbedded with fine gray sandstones. No bed exceeds 1/2" thickness.
Dip approximately 40°

Emplaced packer, ran test.

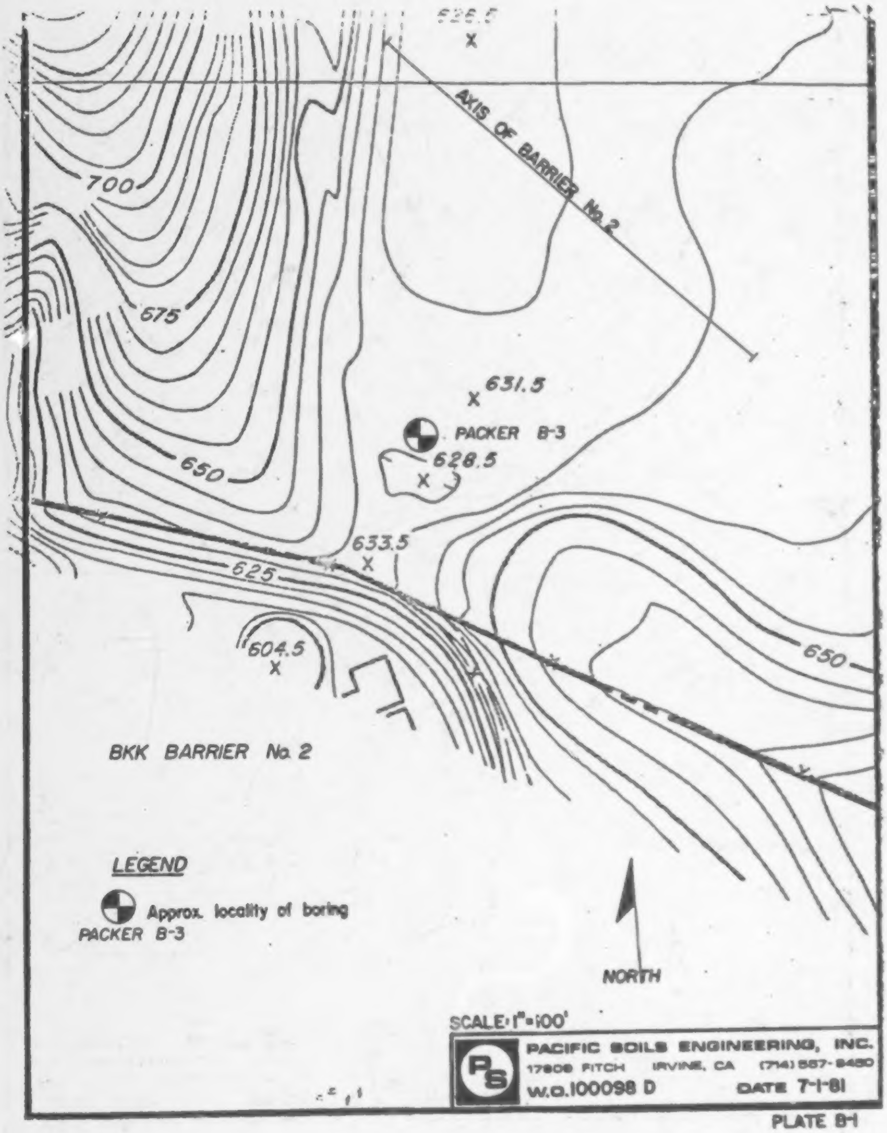
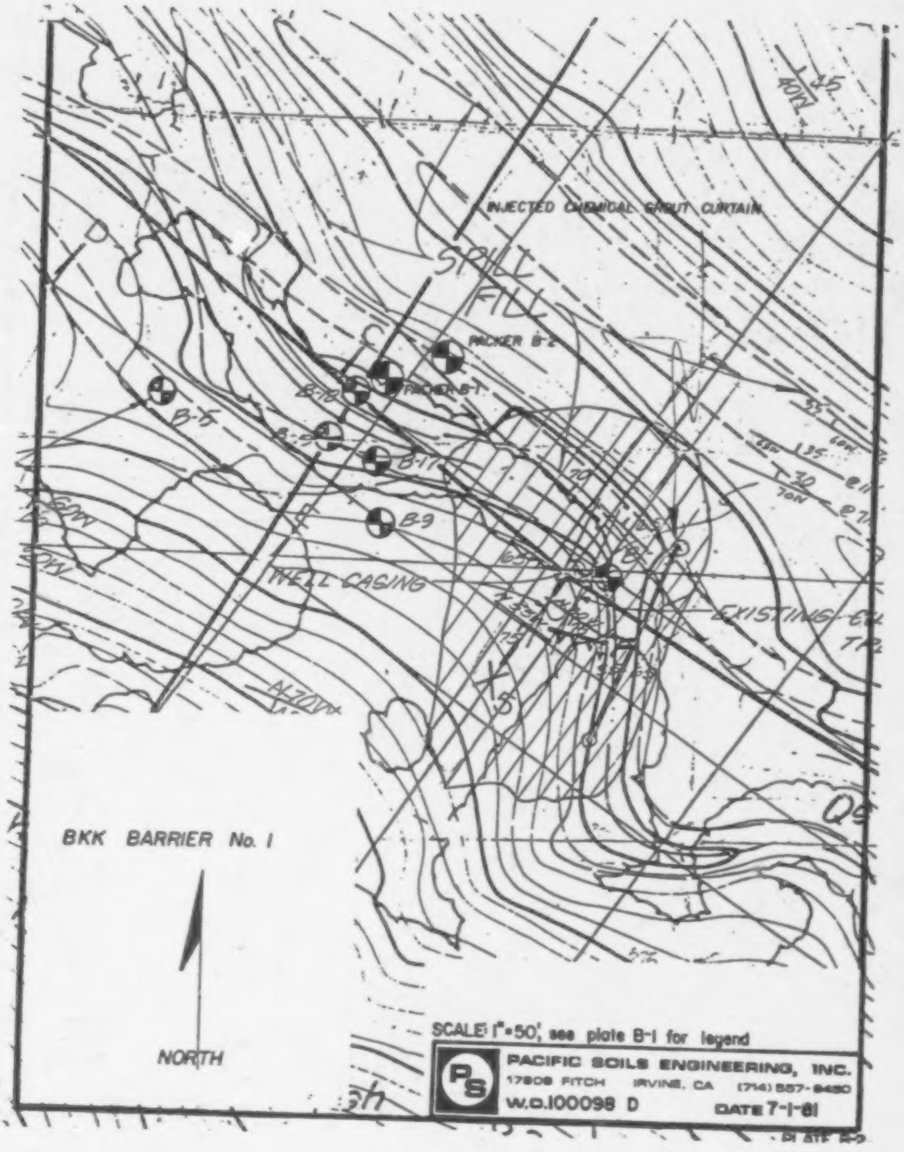

626.5
AXIS OF BARRIER No. 2
700
675
650
631.5
PACKER B-3
628.5
633.5
625
604.5
650
BKK BARRIER No. 2
LEGEND
Approx. locality of boring
PACKER B-3
NORTH
SCALE: 1"=100'
PACIFIC SOILS ENGINEERING, INC.
17909 FITCH IRVINE, CA (714) 557-9450
W.O. 100098 D
DATE 7-1-81

PLATE B-1


INJECTED CHEMICAL GROUT CURTAIN
SPILL FILL
PACKER B-2
PACKER B-1
B-18
B-5
B-17
B-9
WELL CASING
EXISTING
Qs
BKK BARRIER No. 1
NORTH
SCALE: 1"=50', see plate B-1 for legend
PACIFIC SOILS ENGINEERING, INC.
17909 FITCH IRVINE, CA (714) 557-9450
W.O.100098 D
DATE 7-1-81
PLATE B-2

PACIFIC SOILS ENGINEERING, INC.
17909 FITCH, IRVINE, CALIFORNIA 92714
TELEPHONE: (714) 557-9450

L.A. COUNTY OFFICE
1402 W. 240th Street
Harbor City, Ca. 90710
(213) 325-7272 or 775-6771

BKK Corporation
2550 237th Street
Torrance, CA 90505

October 1, 1981
Work Order 100098D

Attention: Mr. Joeseph R. Johnson
Vice President, Engineering

Subject: Evaluation of the Relationship Between the Water-Bearing Alluvium and Nonwater-Bearing Bedrock, in the Vicinity of BKK Landfill, City of West Covina, California

Reference: Review of Geotechnical/Ground WAter Considerations, Federal EPA Hazardous Waste and Consolidated Permit Regulations of May 19, 1980

Gentlemen:

This evaluation, submitted at your request, shows the relationship between the water-bearing alluvium and the nonwater-bearing bedrock of the San Jose Hills in the vicinity of the BKK Landfill site. These units are defined specifically within the reference report.

The relationship between the alluvium and the bedrock is shown on the accompanying 2 : 1 vertically exaggerated cross-sections (Plate 3). The base topographic maps used for the cross-sections are the 2000 scale U.S.G.S. Baldwin Park and San Dimas 7½ minute Quadrangle maps (Plates 1 and 2).

Ground water levels shown on the cross-sections are based on pumping levels during September, 1981 with the exception of the Mt. San Antonio College wells which were measured during 1977 and 1978. This data was obtained from the well-owners or the appropriate water district office. The well localities and cross-section locations are shown on Plates 1 and 2.

It is the opinion of this firm that water in the alluvial ground water basins is not connected with occasional perched water levels in the nonwater-bearing bedrock of the San Jose Hills.

If there are questions regarding this report please contact this office.

Respectfully submitted,
PACIFIC SOILS ENGINEERING, INC.

By:
RICHARD E. LOWNES, E.G. 108
Vice President

Dist: (10) Addressee

DA:REL/ vl

(Plates 1, 2, and 3 are on file at the Subcommittee office.)

FINAL REPORT

INVESTIGATION OF ODOROUS AND VOLATILE COMPOUNDS FOR BKK CLASS I LANDFILL SITE IN THE CITY OF WEST COVINA

Prepared For:

BKK Corporation
2550 237th Street
Torrance, California 90505

by:

Environmental Engineering Program
University of Southern California
Los Angeles, California 90007

July, 1981

EXECUTIVE SUMMARY

This Final Report covers the study of odorous and volatile organic emissions from the BKK landfill site in the City of West Covina. The results obtained in this study were obtained from three sampling periods at BKK and the surrounding residential area: Nov. 1979 - June 1980; Jan. 8, 1981; and Feb. 6, 1981.

The primary objective of the January and February sampling periods in 1981 was to determine if improvements in landfill odor and volatile organic emissions control occured during the course of the study as a result of expansion of the gas recovery system and shut-down of the acid injection wells.

The major findings of this report are summarized as follows:

1. The nature of odor emissions is intermittant and depends to a large extent on meterological conditions. Meterological parameters which showed a definite correlation with the number of received complaints include: wind velocity, wind direction, rainfall, and temperature gradient (ΔT). These parameters are not independent. They are affected by large scale meterology and by site topography. It is the complex combination of these parameters that results in the distribution and concentration of odorous and volatile organic compounds.

2. The major point sources of odor from the landfill site were found to be the working face and the gas burner. Hydrogen sulfide was the major identifiable odorous substance. Other odorous compounds were well below threshold odor concentrations with the exception of benzaldehyde and xylene.

3. A significant reduction of hydrogen sulfide concentrations was observed in the residential area during the Feb. 6, 1981 sampling period. This reduction of hydrogen sulfide concentration may be due to the seven additional gas recovery wells which were placed in operation on Jan. 14, 1981. An areal source is more difficult to control than point sources. However, study results seem to indicate that gas recovery can reduce the odor and emission of volatile compounds from the areal source to a large extent.

4. The maximum concentration of hydrogen sulfide detected at BKK (5.75 ppb at the working face) is many orders of magnitude lower than the NIOSH standard of 20 ppm (30 mg/m^3). Based on the federal standard, it is concluded that the concentration levels of hydrogen sulfide detected at BKK and the surrounding residential area do not indicate a health hazard.

5. The data clearly shows that the working face is the major day time source of emissions for volatile organic compounds. A good correlation between the concentration of odor, total volatile organics, chlorinated hydrocarbons, suspected carcinogens, and hydrogen sulfide, and proximity to the working face was found during the study. Complete elimination of volatile emissions from the working face is not possible; however, improvement is disposal practices such as reducing the area of the working face and more frequent applications of soil cover should help mitigate this problem.

6. The results indicate that the gas burner is a point source of organic emissions. The concentration of volatile organics has been found to be relatively high close to the burner and a good correlation between the organic concentrations and proximity to the gas burner was observed. Total volatile organic concentrations were slightly reduced at the working face and the residential area during the Jan. 8, 1981 sampling period but increased significantly near the gas burner, indicating poor combustion efficiency or that the system was not airtight.

7. Threshold Limit Values (TLV) were compared with maximum concentrations of 40 hydrocarbons detected at BKK and its vicinity. The data show that all of the measured maximum hydrocarbon concentrations are many orders of magnitude less than the Threshold Limit Values. Based on individual TLV's it would appear that hydrocarbon levels at BKK do not indicate a health hazard; however, such a conclusion must be qualified because there might be cumulative and synergistic effects.

8. Total volatile organic concentrations inside the landfill were many orders of magnitude greater than the Federal Ambient Air Quality Standard of 160 $\mu g/m^3$ (0.24 ppm). These concentration levels could lead to adverse effects due to the increased generation of photochemical smog. Unburned hydrocarbons in combination with nitrogen oxide in the presence of sunlight form photochemical oxidants, components of photochemical smog, which have harmful effects on human health and on plants.

9. Volatile organic samples were collected prior to the installation of seven additional gas recovery wells on Jan. 14, 1981. These additional gas recovery wells together with the planned expansion of the gas recovery system over the entire site should be instrumental in reducing emissions of volatile organics providing that the gas burners are operating efficiently by controlled burning at a minimum temperature of 1400°F with sufficient detention time and turbulence in the combustion zone. Other solutions to this problem include application of an afterburner or scrubbing the effluent gas.

10. Among all the volatile organics identified, benzene, chloroform, and vinyl chloride compounds are known to be carcinogenic in nature. A significant reduction of carcinogen concentrations was detected near the working face during the Jan.8, 1981 sampling period. Only a very slight reduction in concentration levels was observed near the gas burner. Carcinogen concentrations near the closed acid well were quite high while levels in the residential area were relatively unchanged. The maximum concentrations of benzene, chloroform, and vinyl chloride measured at BKK were 90, 260, and 770 times lower, respectively, than the applicable NIOSH threshold limit values. Based on the federal standards, the concentration levels of benzene, chloroform, and vinyl chloride do not indicate a health hazard.

11. Due to the volatility and biodegradability (persistence) of benzene, chloroform and vinyl chloride in soil, these carcinogens may be released to the atmosphere over an extended period of time. Alternative methods of treatment and disposal which may be implemented to reduce the migration of benzene, chloroform, and vinyl chloride to the atmosphere include: (1) deep well injection, (2) biological treatment, (3) chemical fixation, (4) encapsulation, and (5) incineration.

12. Approximately 15% of the manifests reviewed in this study did not indicate the hazardous properties of the waste as required by California regulations for the handling of hazardous wastes. Manifests which do not list specific chemicals or indicate possible hazardous properties of the waste could result in the mixing of incompatible wastes in the landfill resulting in possible fires, explosions, or release of toxic substances.

13. Approximately 36% of the manifests did not accurately identify the waste components. It is strongly recommended that the Department of Health Services uniformly enforce the provisions of the California regulations across the entire state. Properly completed manifests will provide for a more orderly and systematic disposal of hazardous wastes.

14. In summary, it is concluded that the problems associated with BKK are essentially aesthetic in nature and are caused primarily by the nuisance odor characteristic of hydrogen sulfide. Based on established health standards, concentration levels of volatile organics detected at BKK and the surrounding residential area do not indicate a health hazard. It is believed that substantial improvements in odor and volatile organic emissions can be achieved through incremental implementation of source control and expansion of the gas recovery system within the landfill.

I INTRODUCTION

This report represents the consolidation of the First and Second Interim Reports. In addition, the results of the evaluation of odor and volatile organics reduction due to additional gas burners and elimination of acid wells, and the summarization of the extensive Gas Chromatography/Mass Spectrometry (GC/MS) data base have been incorporated in this report. The final phase of this study involved the identification of major industrial sources of chloroform and benzene in incoming liquid wastes and the study of alternative disposal practices, e.g., selective deep well disposal of benzene and chloroform-containing liquid wastes; biological treatment; and chemical treatment/encapsulation.

The BKK landfill site is the only operational Class I disposal site in the greater Los Angeles area. Its continued operation is, therefore, very important to the many industrial activities which generate toxic wastes and to the public at large whose health must be protected by proper control and disposal of such wastes.

The problems of odor generation and emission of volatile organic compounds associated with the integrated disposal of solid and liquid wastes in Class I Landfills, have created an unique need for the development of effective landfill emission control measures. Odor problems arise when gases and vapors from industrial wastes and/or decomposed organic matter are dispersed under favorable meteorological conditions.

There are innumerable odors in airborne gases and vapors resulting from various concentrations and intensities of each odorous constituent. As these odorous gases and vapors travel down-wind, they may be intensified by reaction with other gases, vapors, or particulate matter.

The most frequently emitted odors from the anaerobic decomposition of organic matter are hydrogen sulfide, ammonia, methylmercaptans, methylsulfides, amines, indole, skatole, and, to a lesser extent, sulfur dioxide, phenolics, and chlorine compounds. Some organic acid, aldehydes, and ketones may also be odorous either individually or in combination with other compounds. Organic matter under anerobic conditions, will produce odors that have been characterized by different people as rancid, fecal, rotton eggs, cabbage-like, skunk-like, et cetera.

Potential odor problems arising from the disposal of chemical industrial wastes include sulfur containing compounds, nitrogenous compounds, oxygenated compounds (carbonyls, esters, carboxylic acids, alcohols), substituted ethylenic compounds, and benzenoid compounds. Odor descriptions of these various compounds include sweet, sour, onion, garlic, fishy, solvent, sulfidy, burnt rubber, earthy, rotten eggs, hay/straw-like, moth balls, tar-like, shoe polish, medicinal, floral, mustard, hot plastic.

Although the original objective of this study was to investigate the odor problem, the scope of work was expanded to include the detection and control of volatile organic compounds from the landfill, with special attention to the identification of known carcinogens. Specific objectives covered in this phase are as follows:

- To identify the major sources of the odorous and volatile organic compounds.
- To determine the intensity of odor and concentrations of possible carcinogens based on both instrumental and chemical analyses.
- To monitor the dispersion patterns of both odorous and volatile organic compounds.
- To determine if improvements in landfill odor and volatile organic emissions control occured during the course of the study.
- To develop control techniques to reduce the emission of odorous and volatile organic compounds.

Recent advances in Gas Chromatography/Mass Spectrometry instrumentation make it possible to separate and identify the major and minor components of the organic mixtures both at the site and its vicinity. The GC/MS is highly suited to the identification and quantification of the broad spectrum of organic materials likely to be present in the landfill air samples.

II SAMPLING AND ANALYSIS

ODOR COMPLAINT ANALYSIS

This report analyzes the complaints received and compiled by the City of West Covina from January 1, 1978 through May 16, 1979. Odor compaint summary data was obtained from Mr. M.L. Miller, Public Service Director for the City of West Covina. The complaint data, as received was tabulated and included the following information:

- Name of resident lodging the complaint;
- Location of the residence;
- Date of complaint;
- Time of complaint;
- Odor description;
- Wind direction; and
- Comments by inspectors and BKK officials.

During 1978, complaints were received on 232 days which represent 63.6% of the total of 365 days. For 1979, a period covering January 1, through May 16 (136 days), complaints were received on 95 days (69.9%). During the entire study period, complaints were received on 327 days or 65.3% of the total of 501 days.

Meterorlogical conditions corresponding to each complaint were obtained from the following sources:

- Wind direction and velocity -- El Monte Airport;
- Temperature -- National Oceanic and Atmospheric Administration, Civic Center, Los Angeles (NOAA);
- Humidity -- NOAA;
- Thermal inversion -- South Coast Air Quality Management District; and
- Precipitation -- NOAA.

HYDROGEN SULFIDE AND VOLATILE ORGANICS

Sampling

Due to spatial and temporal variations of odor emissions, and since selection of adequate sampling stations could, to a great extent, determine the success of the study, special care was taken in selecting the sampling sites. Fifteen sampling stations were established, located both within the site boundary and in the surrounding residential area. Sampling site selection was based on the following considerations:

- Previous complaint data.
- Major emissions of odorous and volatile organic compounds generated by the working face, liquid disposal wells and gas burners.
- Meteorological factors. These include wind direction and velocity, relative humidity, and inversion heights.
- Time of sampling (related to inversions).

Fifty-four samples were collected at the BKK Site and the surrounding residential area between November 1979 and June 1980. The location of the sampling stations is identified in Figure 1.

All samples were collected in a downwind direction with respect to the working face, unless otherwise specified. Daily, weekly, and seasonal samplings were performed to cover the variety of environmental and seasonal conditons. Samples were analyzed for volatile organic compounds and hydrogen sulfide.

Seven volatile organic samples were collected at BKK and its vicinity on January 8, 1981 between 1 - 4 PM. Eight hydrogen sulfide samples were collected on February 6, 1981 between 6 - 10 PM.

Analysis

Hydrogen Sulfide--

In order to detect low levels of hydrogen sulfide, a sensitive colorimetric method was employed using Mine Safety Appliance (MSA) hydrogen sulfide detection tubes. These tubes were connected to a suction pump, and a limiting orifice was used to control the volume of air flow. Correlation between orifice differential pressures and flow rates were used to determine flow rates and total collected volume of each sampling. With this newly developed method, sensitivity for analyzing low concentrations of hydrogen sulfide is greatly improved.

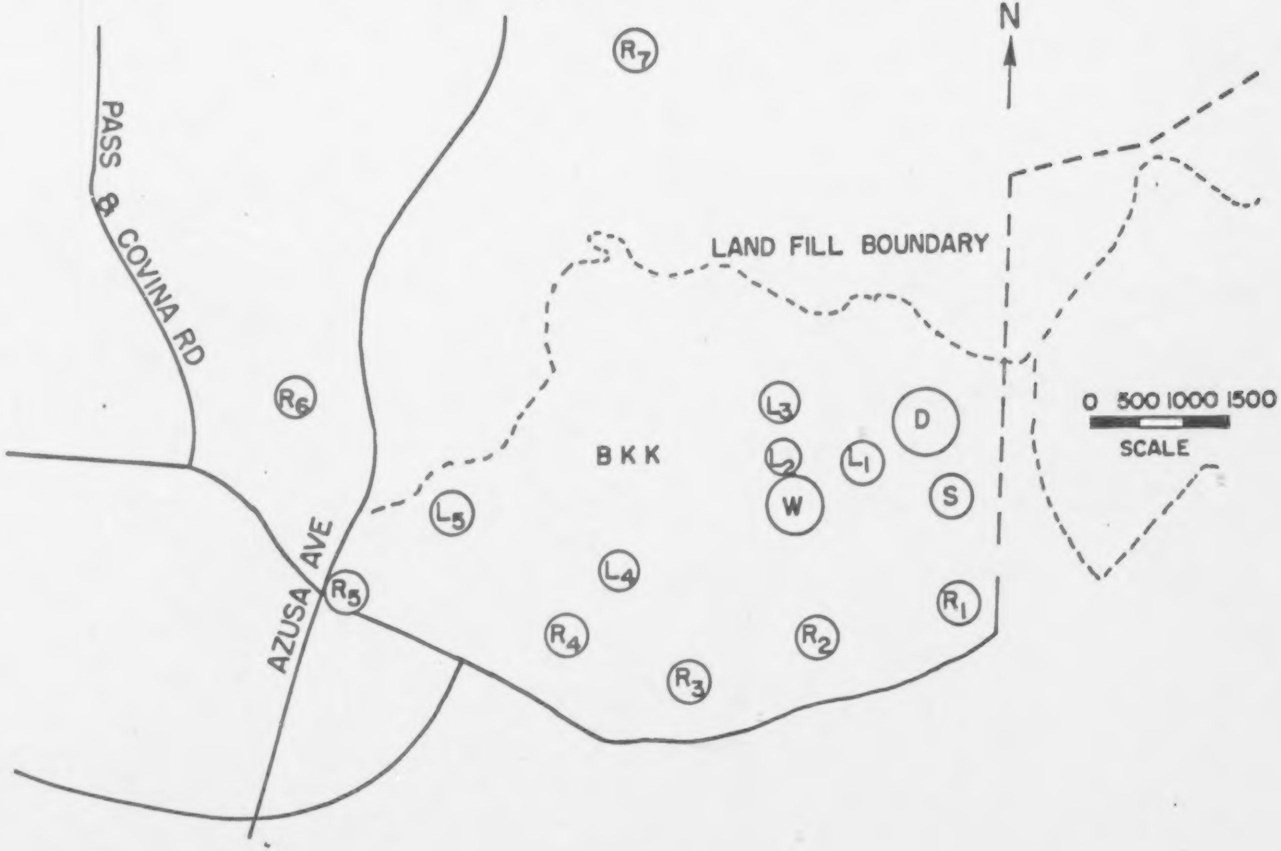

N
LAND FILL BOUNDARY
0 500 1000 1500
SCALE
BKK
D
S
W
L1
L2
L3
L4
L5
R1
R2
R3
R4
R5
R6
R7
PASS & COVINA RD
AZUSA AVE

Figure 1 - Location of Sampling Stations (Legend on Next Page)

Figure 1 - Legend

L = Sampling station in landfill area

R = Sampling station in residential area

S = Meteorological station (wind measurements)

W = Working face

D = Liquid disposal wells

L1 = Near gas burner, 100 m from working face

L2 = 50 m from working face

L3 = 250 m from working face

L4 = Main road to working face

L5 = Entrance to BKK Landfill

The procedure is based on color changes occuring in the reaction between hydrogen sulfide and silver cyanide. Each lot of tubes is separately calibrated over the certified range using standards. The length which developed a color is correlated to the hydrogen sulfide concentration.

Volatile Organics --

Since the concentrations of volatile organics at the BKK Site are generally very low, Tenax - GC was used to concentrate volatiles present in the air at the sampling stations.

The trapping apparatus consisted of a pyrex glass tube, 11 cm X 8 mm ID X 10 mm OD, partially packed with 2 ml of Tenax - GC. The Tenax - GC trap was first preconditioned with a helium flow of 30-50 ml at 375°C for 30 minutes, then connected to a suction pump in the sampling station. Sampling time varied between 10 to 30 minutes depending on the suspected concentrations present at the station.

Analysis of volatile organics was performed using the Gas Chromatography-Mass Spectrometer (GC/MS) procedure. In this precedure a gas chromatograph produces specific peaks for the compounds present which are proportional to their concentration, and the Mass Spectrometer identifies the individual compounds.

The application of a Mass Spectrometer as a universal yet extremely selective and sensitive detector in gas chromatography has revolutionized the identification and measurement of organic compounds. The GC/MS procedure provides a "broad spectrum" organic analysis of both major and minor components and is highly suited to the identification and quantification of the broad spectrum of organic materials likely to be present in the landfill air samples.

ANALYSIS OF MANIFESTS

In addition to analysis of air samples, an extensive effort was made to analyze the manifests reported by the waste producers. A total of 1344 manifests covering the period from October 31 to November 17, 1980 (15 disposal days) were examined. These manifests represent an average of 327,000 gal/day of liquid waste contributed by 380 waste producers.

III RESULTS AND DISCUSSION

ODOR COMPLAINT ANALYSIS

Complaint data supplied by the City of West Covina were first tabulated without any in depth analysis. Comments by the inspector in response to complaints regarding probable source or causes are listed in Table 1. The total number of complaints attributable to BKK is 521. The total number of complaints attributable to other sources is 265. Total odor sources or causes (BKK and others) are 786. The percent of total odor complaints ascribed to BKK is 66.3%. Table 2 represents the summary of complaints attributable to BKK according to the sources listed in Table 1. This summary lists and divides the probable causes of odor into eleven classifications. The contribution of each classification is given as a percent of total. These classifications are based on the descriptions of odor by the complainant. The data show that gas recovery wells, working face, fissures, and washouts have been the major sources of odor at BKK. These four sources generated 71% of the total odor sources at BKK.

Odors indicated by the local residents and summarized by the city have been combined into nine general descriptions as shown in Table 3. The data show that garbage and chemical odor complaints are predominant. Garbage and chemical odor complaints constitute 65.8% of the total odor complaints. The seven remaining odor descriptions could be combined with either garbage and/or chemical odor complaints because the complaints were not specific enough for conclusions to be drawn.

It was found that a large number of complaints were lodged during the initial 4 months of 1979 as compared to the same period in 1978. This result may be attributed to the following activities taking place in the area:

- Influx of people into the newly developed area to the south and west of the BKK landfill; and
- Awareness of the new residents of "dial your complaint".

TABLE 1.

SOURCES OR POSSIBLE CAUSES OF ODOR COMPLAINTS

BKK ODORS

1. Working face or residual odors from working face (123)
2. Fissures (67)
3. Washouts (34)
4. Spray deodorant used at BKK (29)
5. Odors detected (source not stated) at BKK (32)
6. Phosphoric acid spills (15)
7. Area of seepage in BKK (24)
8. Mishandling of odorous liquids (17)
9. Exposed rubbish/wet rubbish (21)
10. Gas recovery wells
    a. Drilling and installation of gas wells (36)
    b. Leaking of gas well caps (41)
    c. Odor penetrating the 3-5 foot cover in the deck in the gas recovery area. Well installed but not operational (37)
    d. Wells damaged by the moisture from the gas being flared. Valves could not be closed (11)
    e. Odor escaping from the gas recovery piping (20)
    f. Incomplete burn of gas due to rain hitting the flame(1)

    TOTAL ODORS ASSOCIATED WITH GAS RECOVERY SYSTEM (146)
11. Misc.
    a. Procedure for disposal of hydro-mud causing problem (4)
    b. New bench drain in gas recovery area (4)
    c. New liquid well drilled-temporary caps leaking (5)

    TOTAL MISC. ODORS (13)

    TOTAL BKK ODORS (521)

TABLE 1. (Concluded)

OTHER SOURCES

1. La Puente landfill (drilling operations) based on prevailing winds (32)
2. Spadra landfill (4)
3. Dairy (8)
4. Wind direction suggests sources other than BKK (does not include La Puente landfill) (16)
5. Unable to find specific source(s) of odors at BKK (205)

TOTAL OTHER SOURCES (265)

TOTAL ODOR SOURCES (BKK AND OTHER) (786)

PERCENT OF TOTAL ODOR COMPLAINTS ASCRIBED TO BKK IS $\frac{521}{786}$ X 100 = 66.3%

TABLE 2.

SUMMARY OF PROBABLE SOURCES OF ODORS OF BKK LANDFILL SITE

SOURCE/CAUSE	% OF TOTAL ODORS
1. Gas recovery wells	28.0
2. Working face	23.6
3. Fissures	12.9
4. Washouts	6.5
5. Odors detected	6.1
6. Spray deodorant	5.6
7. Seepage	4.6
8. Exposed Rubbish	4.0
9. Mishandling odorous liquids	3.3
10. Phosphoric acid spills	2.9
11. Miscellaneous	2.5
TOTAL	100.0

TABLE 3.

SUMMARY OF ODOR COMPLAINTS BASED ON RESIDENTS' DESCRIPTIONS

DESCRIPTION OF ODOR	NO. OF COMPLAINTS	% OF TOTAL ODORS
1. Garbage	358	39.7
2. Chemical	235	26.1
3. Gas	89	9.8
4. Stinks*	86	9.6
5. Rotton eggs (H_2S)	64	7.1
6. Sour milk	33	3.7
7. Sweet	18	2.0
8. Sour	11	1.2
9. Tear gas (NH_3)	7	0.8
TOTALS	901	100.0

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* Variously described as rank, ripe, putrid, rancid, pungent, rotton, nauseating, sickening, and foul.

Wednesday showed a significantly higher number of complaints when compared to the rest of the week. No plausible explanation is possible at this moment. Further work may show some behavioral tendencies which could be related to complaints. Sunday was the day with the least amount of lodged complaints. During this day, BKK is closed for business. The lack of activity within the landfill may be responsible for this trend. Other possible explanations include:

- Residents leaving area for recreation; and
- Residents thinking that no one is available to receive complaints.

Among the climatological parameters, wind direction, rainfall and the presence or absence of a low inversion correlate well with the flux of complaints. Winds blowing from the southwest normally yield a high number of complaints. These winds, known as the sea breezes, are common through most of the year. The residents most affected by the sea breezes are few in number. Eddy circulation may account for the high variability in the complaint locations.

Wind velocity is likely to play a synergistic role relative to wind direction. High wind velocities may be advantageous to dispersal of odors from any source. A lower wind velocity may act to intensify odors close to the site, as opposed to a no-wind condition or high wind speeds. Intuitively, for a given parcel of space, the greater volume of air passing through this space, the greater the dilution effects.

The detection of odors at downwind locations is a result of odor emissions exceeding that which the atmosphere is capable of dispersing to below detection levels. Atmospheric dispersion is highly variable and is dependent upon a number of variables including topography, wind speed and atmospheric stability as measured by such parameters as temperature gradient (ΔT), heat flux, and rate of change of wind direction. Odor emissions can also be highly variable.

The complex topography of the site is probably significant to the transport of odors and also to the type of micrometeorological control systems that could be applied to site. It appears that during nighttime radiative cooling on the slopes, relatively cool air near the surface will drain downslope. Because odors are emitted from the ground surface, this cool air could be highly odorous. This phenomena may be the cause of increased odor complaints between 4:30 P.M. and 10:30 P.M., a period when radiative cooling is taking place. Downslope drainage of cold air at BKK during calm conditions was documented visually using a smoke candle by Eutek, Inc. in January, 1981 (1).

Essentially all air impurities are eventually cleansed from the atmosphere by the natural process, generally referred to as precipitation washout. The rate of odor removal is dependent upon the size of raindrops and the rate of precipitation. The incidence of rainfall appears initially advantageous to surrounding residents, viz., decreased complaints. However, in the days following heavy rainfall, the number of complaints normally rises. The solubilization of chemical forms or organics may also be responsible for the increase of odor due to the higher microbial activity.

Maximum and minimum temperatures and relative humidity showed no obvious trends relative to the number of complaints. However, the interaction of these parameters with other meteorological factors may be significant. The role of climate in the fate of odors is not well defined. No single parameter can account for the oscillatory nature of complaints with the possible exception of wind direction and velocity.

OLFACTORY ODOR (Nov. 1979 - June 1980 Sampling Period)

The degree of obnoxiousness of malodorous gases and vapors depends not only on the concentration of the odor and on the person exposed to the odor but also on the intensity of the odor. Most people are particularly sensitive, and have greater acuity, to unfamiliar odors. Olfactory sensitivity varies from person to person. The olfactory senses of persons continually exposed to an odor become anosmic or insensitive to that odor with time; therefore, odor nuisance determinations are highly subjective.

One of the methods performed to evaluate the extent of odor nuisance in the landfill and its vicinity was a simple estimation of olfactory odor range. Estimation of odor presence in the sampling stations was done by a trained technician. who attempted to categorize the odor extent in a scale of 0 to 3, according to odor intensity, as follows:

0 = no odor present
1 = weak odor present
2 = moderate odor present
3 = strong odor present

These estimations were performed simultaneously with actual samplings, while endeavoring to assess concentration fluctuations between day and night, different days of the week, and different seasons.

The bar chart in Figure 2 indicates a positive correlation between odor intensity and proximity to the working face for various sampling stations during day-time and night-time detection periods. Exhaust gases from the gas burner were analyzed and found to be free of malodorous constituents. It is concluded that the working face is a major source of odor emissions.

Figure 2 shows a high odor intensity during the day close to the working face while no odors were detected at residential areas R1, R3, R4, and R7 which are approximately 600, 750, 900, and 1350 meters, respectively, from the working face. During night-time after closure of the working face, the odor intensity at the working face was reduced by a significant amount while the residential areas showed a much greater odor intensity during night-time than during

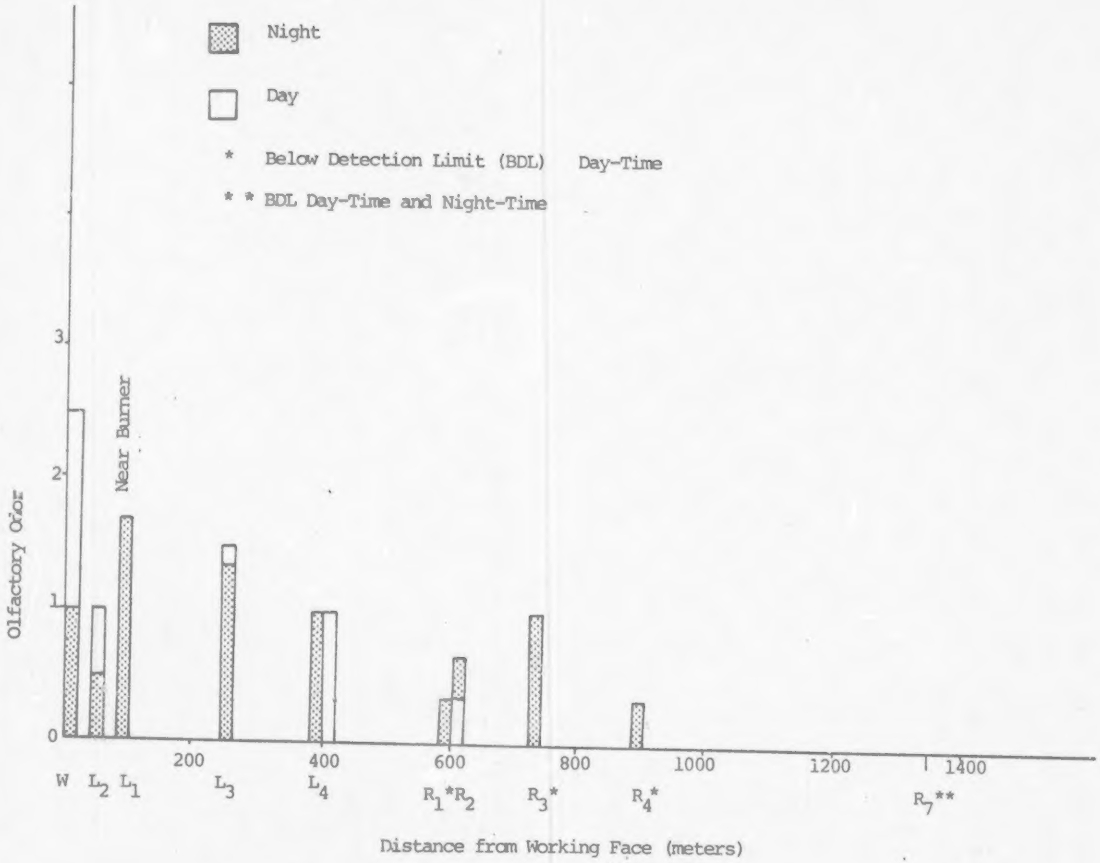


Figure 2 Correlation between Estimated Olfactory Odor and Working Face Distance

day-time periods. These observations support the previously discussed historical odor complaint analysis which showed a significant increase of odor complaints during the night, (i.e., 4:30 p.m. to 10:30 p.m.) a period when radiation cooling is taking place. A night-time inversion coupled with downslope drainage of cool air during calm conditions is probably responsible for the increase of complaints during this time period.

The results obtained in this study show that no correlation exists between total volatile hydrocarbon concentrations and estimated odor intensity. This indicates that odor and volatile organic compounds are not necessarily emitted from identical sources. If organics are the major source of odor problems, it would be expected that total volatile organic concentrations would correlate with the extent of odor detected in the area. However, very high organic concentrations were present when the odor level was estimated "weak", while in some cases, in the presence of very low organic concentrations, the odor level was estimated as "strong". A comparison of threshold odor concentrations of odor producing substances with the maximum measured values at the BKK Site as shown in Table 4, indicates that hydrogen sulfide is the major odor producing component. The data also show that benzaldehyde and xylene may contribute to the odor problem.

HYDROGEN SULFIDE (Nov. 1979 - June 1980 Sampling Period)

Hydrogen sulfide is a colorless gas having the characteristic odor of rotten eggs. The gas is flammable, burning in air with a pale blue flame; the ignition temperature is 260°C. Hydrogen sulfide may be generated at the BKK Landfill as a result of bacteriological decomposition of protein and sulfur-containing organic matter under anaerobic conditions. It may also be present in certain industrial wastes, or be produced from them by the sulfate reduction process or by dissolution of metal sulfides after pH reduction due to injection of acidic wastes.

TABLE 4

Threshold Concentrations of Odor Producing Substances and Maximum Measured Values at BKK Site. (2)

	TOC* ppm	Max Conc. ppm
Acetone	100	0.049
Benzaldehyde	0.006	0.015
Benzene	4.68	0.113
Butyl Cellusolve	0.48	0.0013
Carbon Disulfide	0.21	0.0035
Chloroethene (Vinyl Chloride)	4000	0.0013
Chloroform	205	0.038
Carbon Tetrachloride	200	0.0016
Cyclohexane	0.41	0.0065
Dichlorobenzene	50	0.055
Dichloroethylene	550	0.0070
Dichloromethane (Methylene Chloride)	214	0.12
Dioxane	5.7	0.011
Ethyl Ether	0.33	0.012
2-Etoxyethylacetate	0.25	0.011
Heptane	223	0.014
Hydrogen Sulfide	0.00047	0.0058
Isopropyl Alcohol	28.2	0.027
Methylethylketone (MEK)	10	0.0054
Methylcyclohexane	500	0.022
5-methyl-3-Heptane	5	0.0023
Methylisobutylketone (MIBK)	0.47	0.010
Monochlorobenzene	0.21	0.052
Octane	150	0.078
Pentane	990	0.083
Pinene	0.0114	0.0021
Tetrachloroethane	3	0.0067
Tetrachloroethylene	4.7	0.035
1,1,1 Trichloroethane (Methyl Chloroform)	400	0.014
1,1,2 Trichloroethane (Vinyltrichloride)	100	0.014
Trichloroethylene	21.4	0.0065
Toluene	2.14	0.624
Xylene	0.27	0.82

*Threshold Odor Concentration

Hydrogen sulfide is an important odorous component for this study, since there is no odor more readily identifiable to the average individual than that of hydrogen sulfide. A very low concentration of 0.00047 ppm (TOC) cause an objectionable rotten egg odor, and is easily detected by olfaction although it is not believed to be associated with significant health effects at this concentration level.

There is no unanimity of opinion among authors as to whether chronic hydrogen sulfide poisoning represents a discrete clinical entity. Some believe that the signs and symptoms collectively referred to as chronic poisoning, actually represent recurring acute or sub-acute toxic exposures.

A published study of chronic low level exposure to hydrogen sulfide showed minimal correlation between exposure to hydrogen sulfide and any chronic effects.(3) The existing hydrogen sulfide levels in the landfill and around the residential area, at most, can be considered as chronic very low level exposure at irregular intervals.

No national ambient air quality standards have been adopted for the United States; the State of California has issued an ambient air quality standard of 0.03 ppm (0.045 mg/m^3), averaged over one hour. The American Conference of Governmental Industrial Hygienists (ACGIH) has set a threshold limit value (TLV) of 15 mg/m^3 (10 ppm) averaged over an 8-hour work day and a 40-hour workweek. The National Institute for Occupational Safety and Health (NIOSH) established a TLV of 30 mg/m^3 (20 ppm) for a time-weighted 8-hour workday and 40-hour workweek.

Figure 3 shows the distribution of hydrogen sulfide at the landfill site and its vicinity. During day-time operation hours, hydrogen sulfide concentrations were very high close to the working face, acid wells, and the gas burners, while the levels in the residential area were below the detection limit with the exception of a very low concentration at sampling station R4. During the night, the concentration of hydrogen sulfide near the working face dropped off perceptively while the residential areas showed a significant increase in hydrogen sulfide concentrations. These trends are identical to those observed for the estimated olfactory odor correlation with distance from the working face (Figure 2).

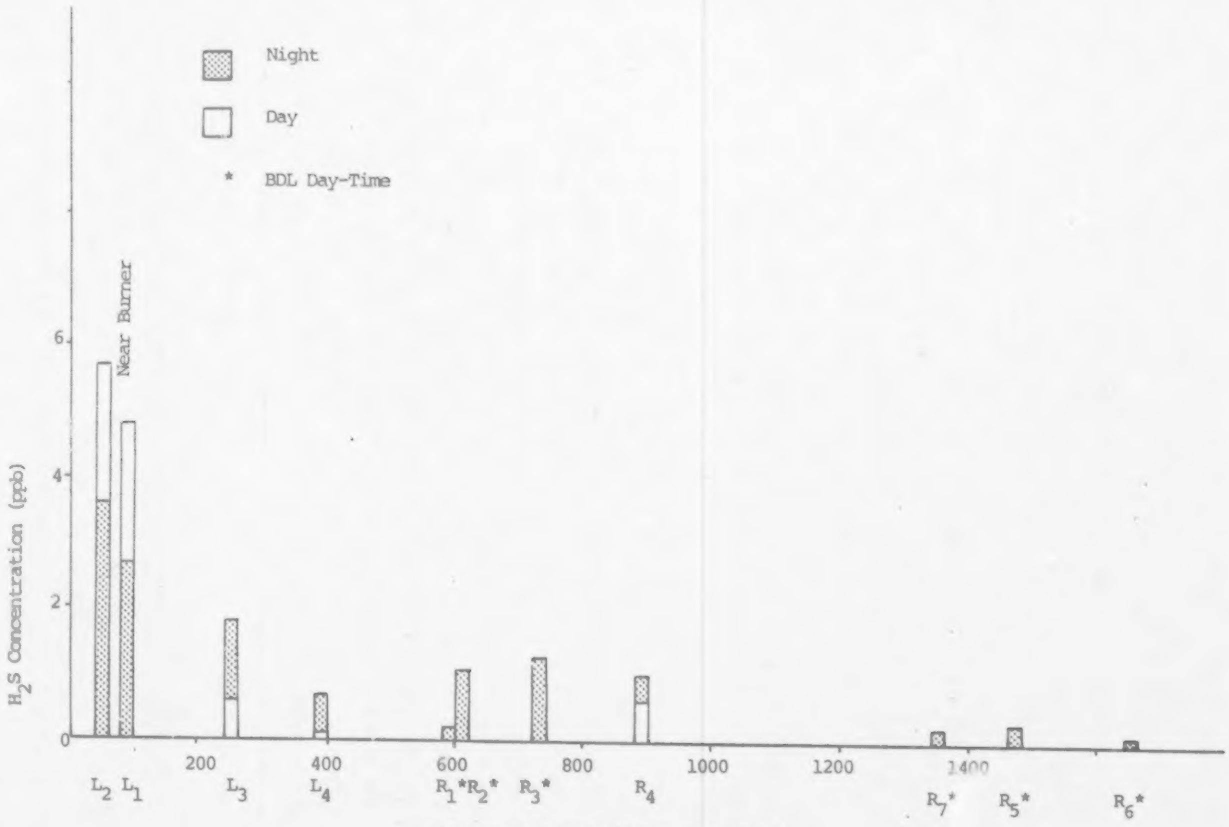


Figure 3 Hydrogen Sulfide Concentration at BKK and Vicinity

Hydrogen sulfide concentration ranged from below detection limit to a maximum of 5.75 ppb (0.0057 ppm, 0.0086 mg/m^3). The maximum concentration is approximately 3500 times lower than the NIOSH standard of 20 ppm (30 mg/m^3). Based on the federal standard, it is concluded that the concentration levels of hydrogen sulfide detected at BKK and the surrounding residential areas do not present a health hazard. The problem is one of aesthetics; any adverse effects are caused by the nuisance odor characteristic of this compound.

VOLATILE ORGANICS (Nov. 1979 - June 1980 Sampling Period)

Since this study was not guided by a predetermined list of compounds to be measured, a broad spectrum organics analysis was performed, with the goal of obtaining a wide spectrum picture of the major or minor components present. Qualitatively, the samples resemble each other greatly in consisting of light hydrocarbons fairly typical of gasoline fractions; some chlorinated hydrocarbon solvents and organic silicone compounds are also present.

No meaningful patterns were detected in the seasonal variations for samples obtained during the period November 1979 to June 1980. In general, the same series of major components are repeated each sampling day. However, the relative percentage of these major components varies depending on the location of the sampling stations. This probably is related to the degree of volatility of the compounds, permitting some chemical to be present at longer distances from the source.

Figure 4 compares the total average concentration of volatile organic compounds at the landfill and its adjacent residential area. Sampling station R_4 does not follow the general trend of correlation between concentrations and proximity to the working face. A reasonable explanation for these deviations is the dominant SSW wind direction for which R_4 is located downwind from the BKK site. This trend was experienced for other parameters. A similar explanation may apply to R_2 concentrations which are always higher for all parameters than those for R_1 although both of these stations are located approximately 600 meters from the working face.

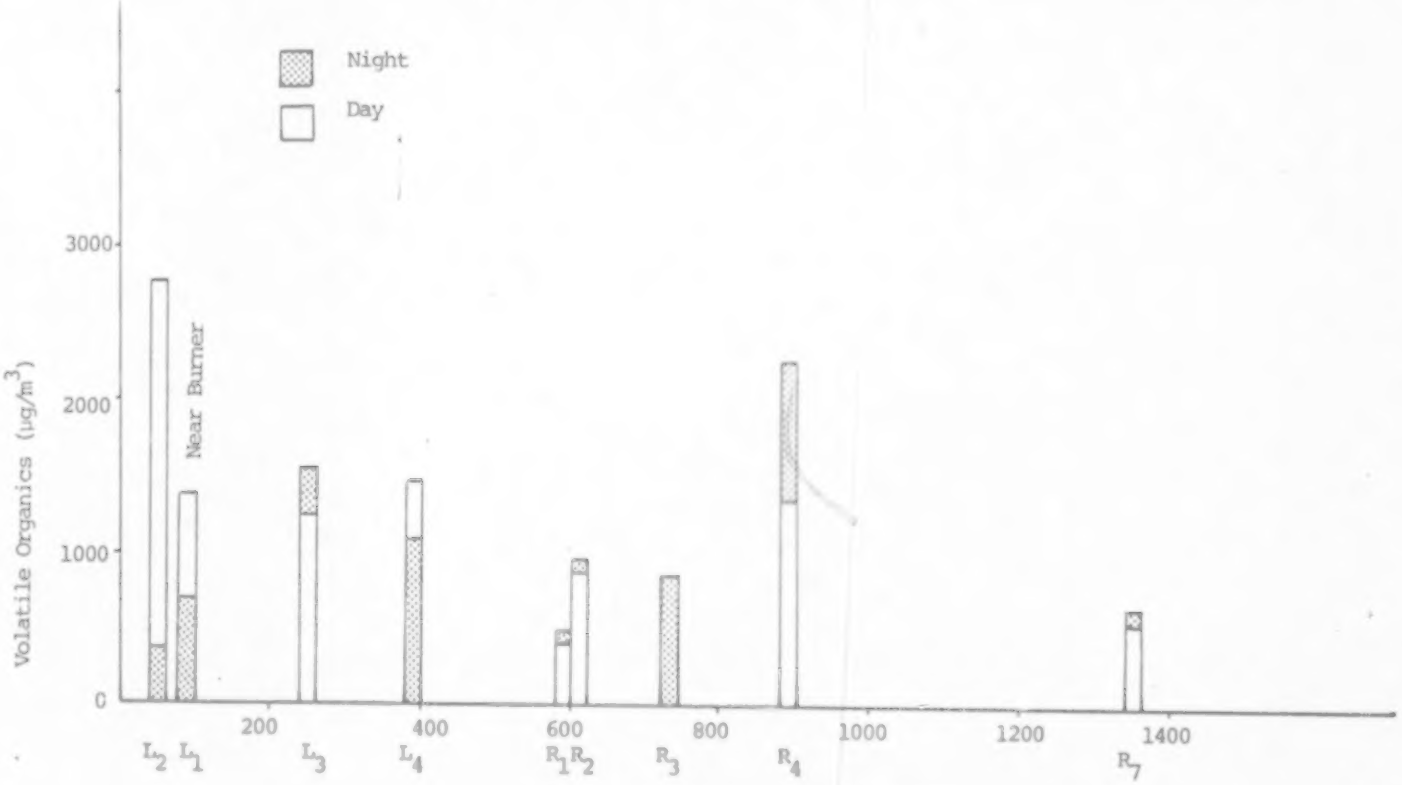


Figure 4 Average Volatile Organic Concentrations at BKK and Vicinity

Figure 4 shows that volatile organic concentrations were very high close to the working face during the day while the levels in the residential area were relatively lower. During the night, the concentration levels were significantly reduced near the working face while the residential area showed relatively higher concentrations.

Total volatile organics concentrations inside the landfill showed a wide range of values, covering from 30 $\mu g/m^3$ to 9000 $\mu g/m^3$. The average concentration observed was 1300 $\mu g/m^3$; this value is many orders of magnitude greater than the Federal Ambient Air Quality Standard of 160 $\mu g/m^3$ (0.24 ppm) as maximum 3-hour concentration (6-9 AM) not to be exceeded more than once a year. These concentration levels could lead to adverse effects due to the increased generation of photochemical smog. Unburned hydrocarbons in combination with nitrogen oxide in the presence of sunlight form photochemical oxidants, components of photochemical smog, which have harmful effects on human health and on plants (4).

Concentrations of volatile organics could possibly be decreased by more frequent covering of liquid industrial wastes with layers of soil which has highly adsorptive properties. The concentrations measured at Station L_1 indicate that the gas burner is a probable source of volatile organic emissions. It is essential that hydrocarbon control techniques be employed at the BKK landfield site and that these techniques be optimized in terms of reduction of emissions.

Threshold Limit Values (TLV) and maximum concentrations of 40 hydrocarbons detected at BKK and its vicinity are listed in Table 5. The data show that all of the measured maximum hydrocarbon concentrations are many orders of magnitude less than the Threshold Limit Values. Based on individual TLVs, it would appear that hydrocarbon levels at BKK do not present a chronic health hazard; however, such a conclusion must be viewed with caution. It should be noted that Threshold Limit Values represent conditions under which it is believed that nearly all workers may be exposed under interruped conditions (i.e., 8-hour workday and 40-hour workweek) without adverse effect. Threshold Limit Values are not intended for use in estimating the toxic potential of continuous

TABLE 5

Threshold Limit Values and Maximum Measured Values of Hydrocarbons at BKK Site.

	TLV* mg/m^3	Max. Conc. mg/m^3	$\frac{\text{Max. Conc.}}{\text{TLV}}$ x100 (%)
Acetone	2400	0.12	0.005
Benzene	30	0.364	1.21
Butyl Cellusolve	240	0.0063	0.0026
Butylmethylketone	100	0.0413	0.041
Carbon Disulfide	60	0.011	0.0183
Chloroethene (Vinyl Chloride)	3	0.0032	0.11
Chloroform	50	0.190	0.38
Carbon Tetrachloride	65	0.0099	0.0152
Chlorotoluene	50	0.0435	0.087
Cyclohexane	1050	0.0223	0.0021
Dichlorobenzene	300	0.330	0.11
Dichloroethane	400	0.300	0.075
Dichloroethylene	790	0.028	0.0035
Dichloromethane (Methylene Chloride)	1740	0.410	0.024
Dioxane	360	0.039	0.011
Ethyl Benzene	435	0.950	0.22
Ethyl Ether	1200	0.036	0.0030
Ethylmethylbenzene	50	0.0952	0.19
2-Etoxyethylacetate	540	0.062	0.012
Heptane	2000	0.058	0.0029
Hexane	1800	0.420	0.023
Isopropyl Alcohol	980	0.067	0.0068
Methylethylketone (MEK)	590	0.0158	0.0027
Methylcyclohexane	2000	0.087	0.0044
2-Methylfuran (Silvan)	1	0.0095	0.95
3-Methylhexane	2000	0.130	0.0065
5-Methyl-3-Hepatone	130	0.012	0.0092
Methyisobutylketone (MIBK)	410	0.0413	0.010
Monochlorobenzene	350	0.242	0.069
Octane	2350	0.373	0.016
Pentane	2950	0.250	0.0085
Tetrachloroethane	35	0.048	0.14
Tetrachloroethylene	670	0.234	0.035
1,1,1 Trichloroethane (Methyl Chloroform)	1900	0.0793	0.0042
1,1,2 Trichloroethane (Vinyltrichloride)	55	0.077	0.14
Trichloroethylene	535	0.036	0.0067
Trimethylbenzene	120	0.0143	0.012
Toluene	750	2.40	0.32
Xylene	435	3.58	0.83
Hydrogen Sulfide	30	0.0082	0.027

*Threshold Limit Value (OSHA) Ref. (2)

uninterrupted exposures or in assessing the health hazards which may be associated with exposure to mixtures of two or more substances (5). The determination of the cumulative and synergistic health effects of hydrocarbon levels measured at BKK and the surrounding residential area is beyond the scope of this study.

CARCINOGENS (Nov. 1979 - June 1980 Sampling Period)

One of the major concerns in studying the composition of volatile organic compounds is the presence of compounds identified as possible carcinogens.

The Occupational Safety and Health Administration (OSHA) has proposed a comprehensive policy in regulating human exposures to potential carcinogens. Under the proposed policy a substance (depending upon its carcinogenicity) is put into one of four categories:

Category I - confirmed carcinogens. Substances found to be carcinogenic in humans or in two mammalian species of test animals, or in one species if the same results were obtained by more than one series of experiments.

Category II - suspected carcinogens. Evidence of carcinogenicity is suggestive or it positive in one species of test animals.

Category III - those substances which require further research. No regulatory action necessary.

Category IV - those substances which are not currently found in the American workplace. No regulatory action necessary.

Among the organics identified by GC/MS analysis, three compounds are included in Category I carcinogens: chloroform, benzene, and vinyl chloride.

Chloroform

Chloroform ($CHCl_3$) is in liquid form at normal ambient temperatures and pressures. Its boiling point is low (61°), resulting in a high vapor pressure, which is responsible for its movement into the atmosphere. Its specific gravity (1.5) is greater than that of air. This property is of interest since it is responsible for settling of the vapors on the lower levels of the atmosphere, greatly delaying complete mixing.

The most serious hazard of repeated exposure to chloroform inhalation is injury to the liver and kidneys. Evidence indicates that in man, repeated exposure to atmospheric concentrations well below the odor threshold may cause such injury. Industrial experience has shown that daily exposure to concentrations below 100 ppm may result in a variety of nervous system and alimentary tract symptoms, in the absence of demonstrable evidence of injury. Injury to the liver is similar to but somewhat less severe than that caused by carbon tetrachloride. Kidney injury is usually associated with, but less severe than, liver injury(6).

The ACGIH has established a TLV of 25 ppm (120 mg/m^3) for chloroform; the NIOSH standard is 10 ppm (50 mg/m^3).

Figure 5 shows very high chloroform concentrations close to the working face during the day while no chloroform was detected in the residential area. During the night, no chloroform was detected near the working face or in the residential area with the exception of a relatively low concentration at sampling station R_4.

Chloroform concentrations ranged from below detection limit to a maximum of 0.038 ppm (190 μg/m^3). The maximum concentration is approximately 260 orders of magnitude less than the NIOSH standard of 10 ppm (50 mg/m^3). Based on the federal standard, the concentration levels of chloroform measured at BKK and the surrounding residential area do not indicate a health hazard.

Benzene

Benzene is a clear colorless liquid with a relative low boiling point of 80°C, and a high vapor pressure of 100 mm at 26.1°C. It is a poisonous substance with acute and chronic toxic effects. Chronic benzene poisoning affects blood - forming cells leading to lukemia (7). ACGIH and NIOSH have established a standard of 10 ppm (30 mg/m^3) for benzene.

Figure 6 shows that benzene concentrations were very high near the working face and the gas burner during the day and were relatively high in the residential area particularly at sampling station R_2. During the night, the concentration levels were significantly reduced near the working face but remained high near the burner. Concentration levels remained relatively high in the residential area during the night.

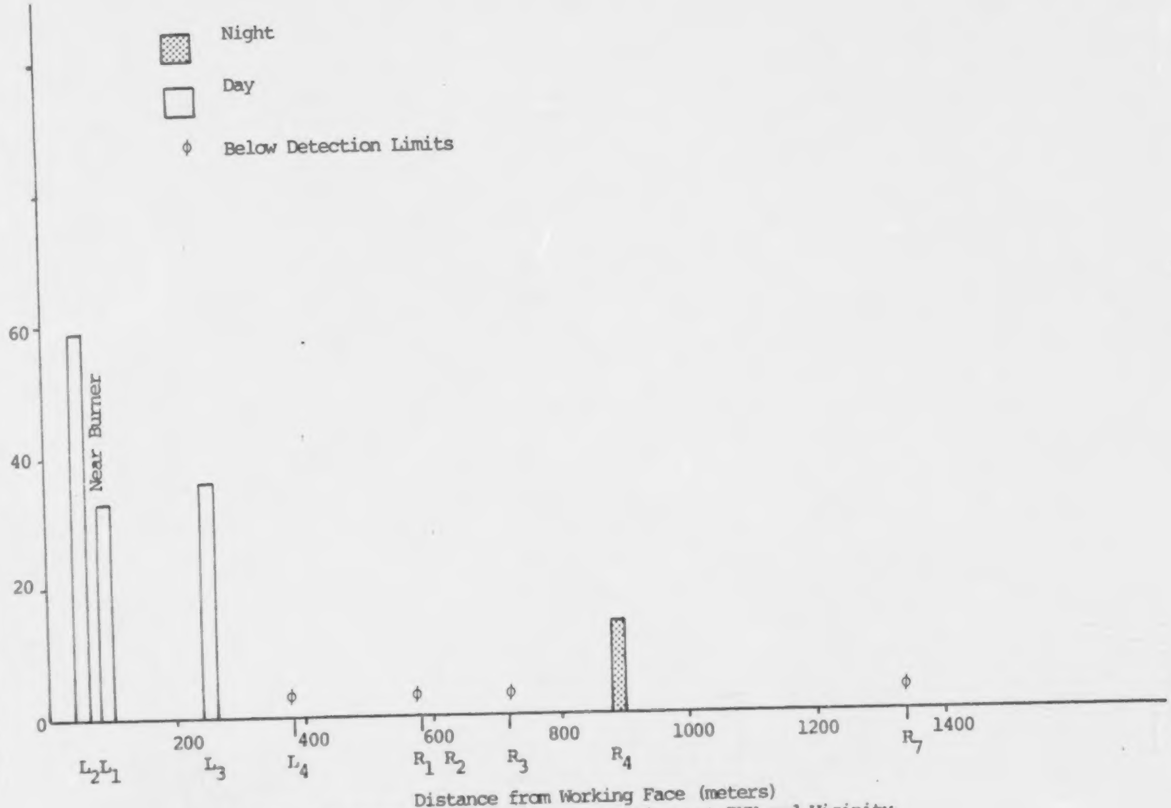
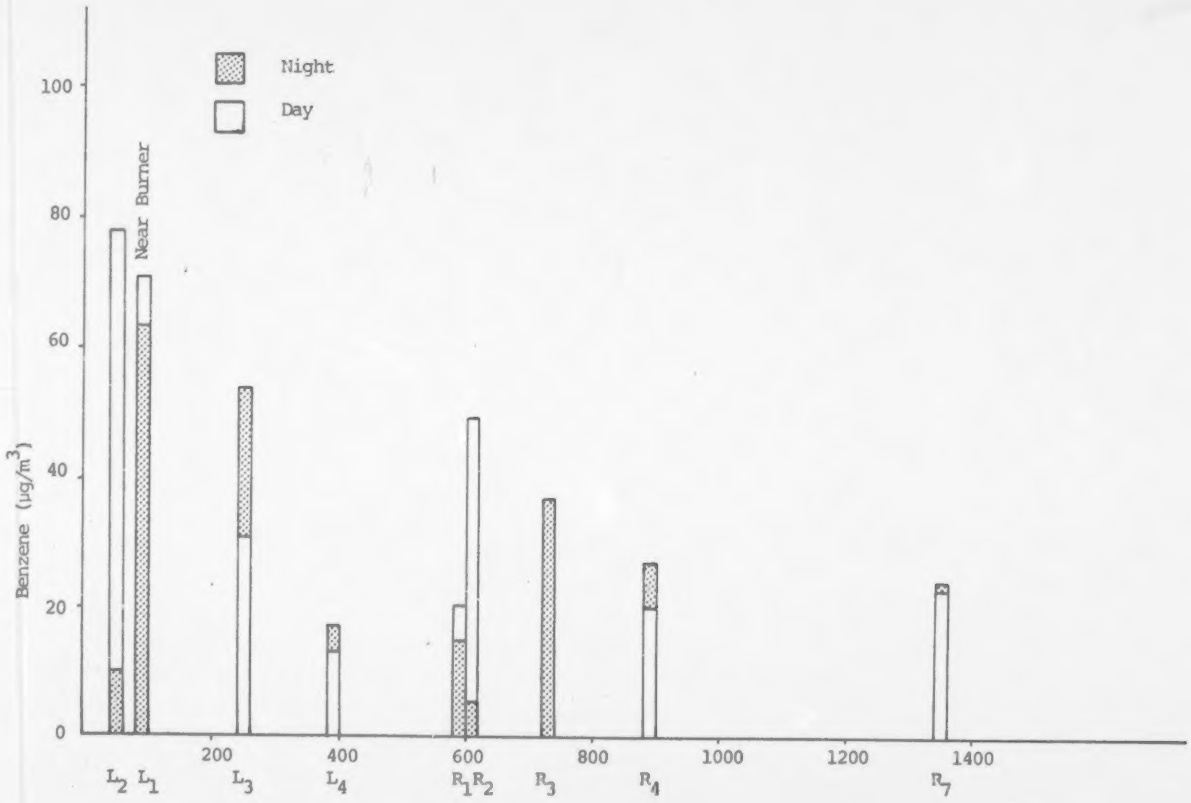


Figure 5 Average Chloroform Concentrations at BKK and Vicinity



Distance from Working Face (meters)

Figure 6 Average Benzene Concentrations at BKK and Vicinity

Benzene concentrations ranged from below detection limit to a maximum of 0.113 ppm (364 $\mu g/m^3$). The maximum concentration is approximately 90 orders of magnitude less than the NIOSH standard of 10 ppm (30 mg/m^3). Based on the federal standard, the concentration levels of benzene detected at BKK and the surrounding residential area do not present a health hazard.

Vinyl Chloride

Vinyl Chloride is a colorless gas having a boiling point of -13.9°C and is a recognized carcinogen of the liver. Vinyl Chloride was detected in only one of the 54 samples. The measured concentration of 0.0013 ppm (3.2 $\mu g/m^3$) is approximately 770 orders of magnitude less than the NIOSH standard of 1 ppm (3 mg/m^3). Based on the federal standard, the concentration levels of vinyl chloride at BKK and the surrounding residential area do not indicate a health hazard. BKK has ceased accepting waste containing vinyl chloride.

Recent tests by the South Coast Air Quality Management District at the landfill confirmed earlier findings of traces of vinyl chloride. Although the vast majority of the more than 50 readings taken for this contaminant in the residential area adjacent to BKK were well below the state standard of .01 parts per million (ppm) for 24 hours, five readings were right at the standard and three above it. The highest level was 0.05 ppm. The OSHA (work place) health standard for vinyl chloride is 1.0 ppm, which is 20 times higher than the highest reading taken near the BKK landfill. Vinyl chloride, a key chemical compound of the plastics industry, has been identified by EPA as a hazardous compound.

Figure 7 shows that total carcinogens (chloroform and benzene) were very high near the working face and the gas burner during the day and were relatively high in the residential area. During the night, the carcinogen levels dropped off perceptively at the working face but remained high near the gas burner. During the night, the concentration levels remained relatively high in comparison with the daytime level in the residential area. Figure 7 indicates a positive correlation between total carcinogen concentrations and proximity to the working face during day-time detection periods.

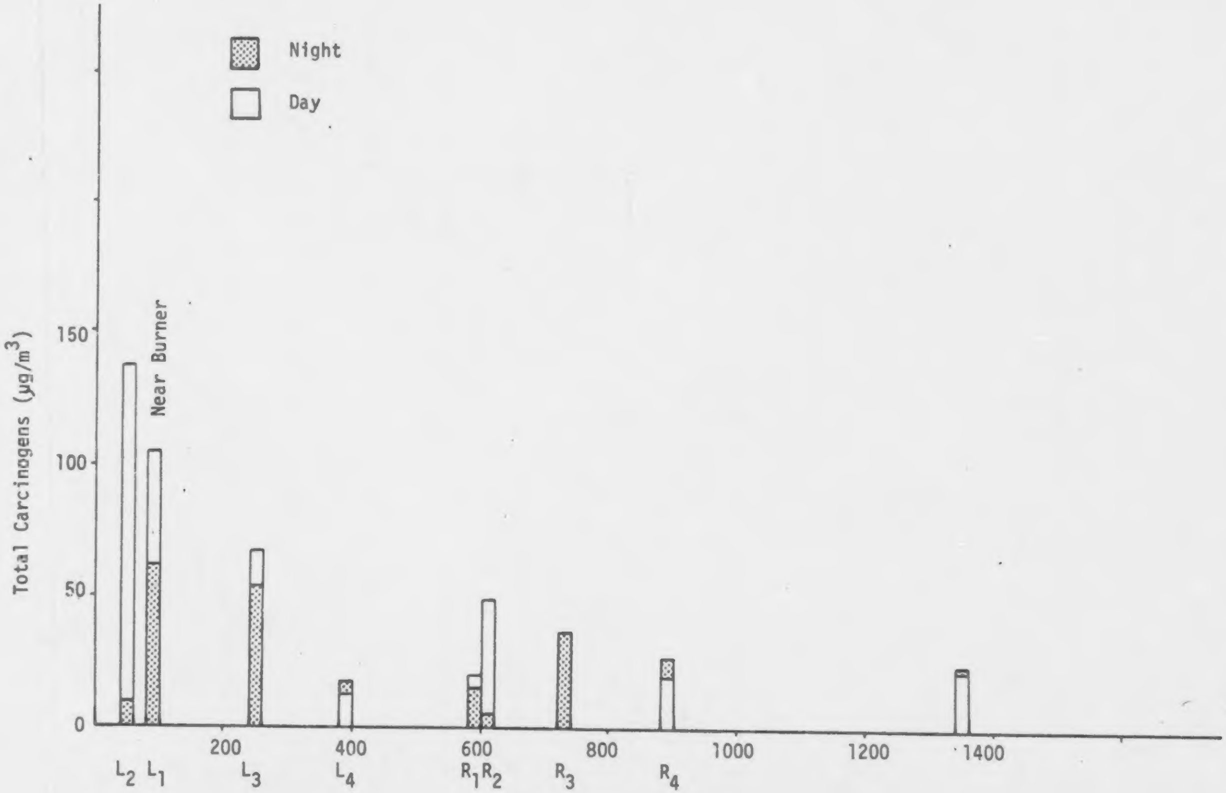


Figure 7 Total Carcinogens at BKK and Vicinity

The data obtained in this study show a correlation between total carcinogens and total volatile organic concentrations. This positive correlation between these two sets of data indicates that carcinogens are part of the volatile organics disposed at BKK, and that their concentration is proportional to the total amount of organics. This correlation implies that the carcinogens present at the landfill may only be eliminated by strict cource control or stringent disposal practices. Alternative treatment and disposal methods for benzene and chloroform-containing liquid wastes are presented in Appendix A.

CHLORINATED HYDROCARBONS (Nov. 1979 - June 1980 Sampling Period)

Chlorinated hydrocarbons should be taken into consideration because recent investigations indicate that a major portion of these compounds are suspected to be hazardous to human health and they also serve as initiators of secondary air pollutants. However, no U.S. ambient standards have been proposed for these compounds.

Table 8 shows that chlorinated hydrocarbon concentrations during the day were high near the working face and even higher near the gas burner. The residential area showed relatively high concentration levels during the day. During the night, the concentration levels remained high near the working face but were considerably reduced near the gas burner, while the residential area showed relatively little change.

DISPERSION PATTERNS

In order to identify the source of major emissions, **samples were** collected in relation to working face, gas burners and acid wells. Since the working face was found to be the major source of odor complaints, samples were collected at 50, 100, 350, 600, 900 and in some cases 1200 meters distance down wind from the working face. Odor intensities, the concentrations of hydrogen sulfide, total volatile organics, total carcinogens, and total chlorinated organics were plotted against distance from the working face. These major parameters all showed a good correlation between concentrations and proximity to the working face. The measurements were performed downwind, and

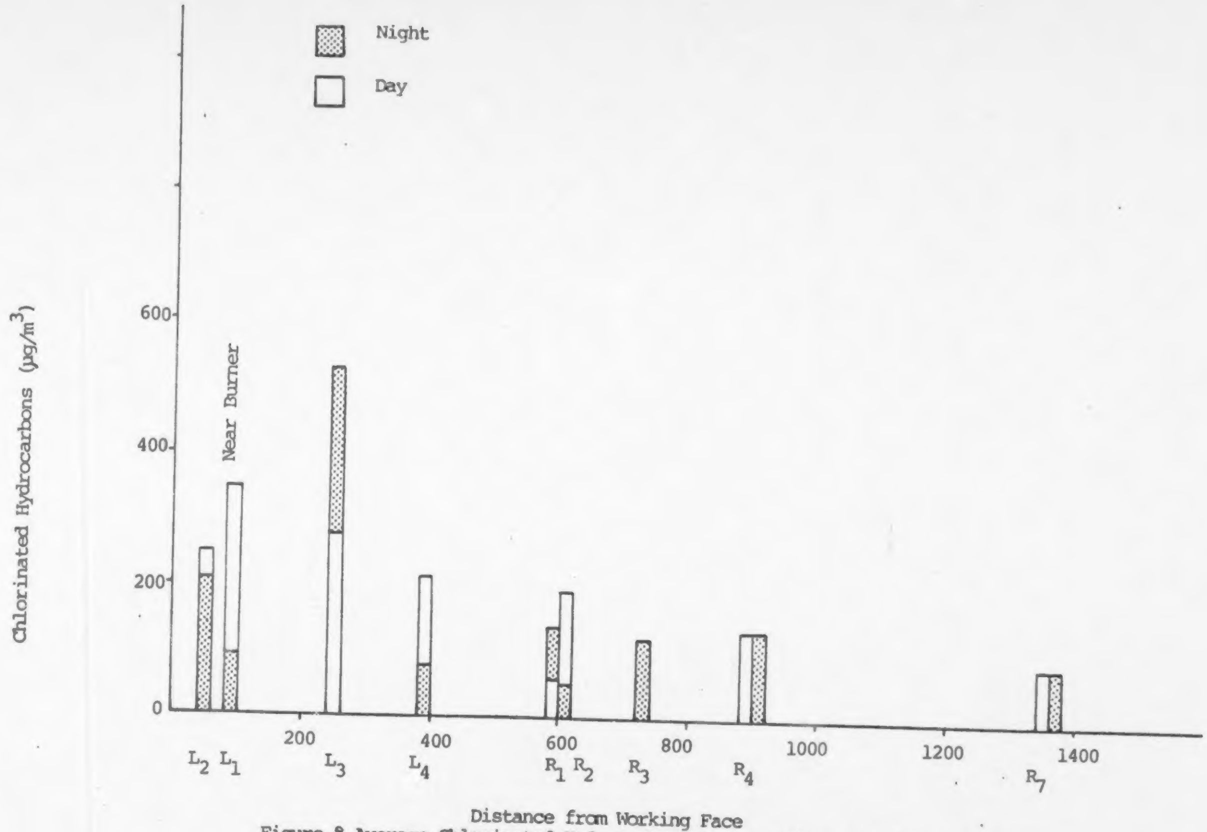


Figure 8 Average Chlorinated Hydrocarbon Concentrations at BKK and Vicinity

illustrate the important role of wind direction and velocity in indicating the most affected points of the adjacent area. The important role of wind, as the major dispersion force of odorous compounds was confirmed by the simultaneous collection of two samples, both at a distance of 50 meters from the working face, but one located downwind and one upwind from it. Total volatile organcs concentration for these samples were 8,880 and 1,090 $\mu g/m^3$ respectively. The fact that the downwind concentration was eight times higher verifies the importance of wind dispersion.

The importance of the gas burner as source of volatile organics and hydrogen sulfide was determined by collecting a series of samples at increasing distances downwind from the gas burner. The results indicate that the gas burner, which is located within the landfill, is a point source of organic and hydrogen sulfide emissions. The concentration of volatile organics and hydrogen sulfide has been found to be relatively high close to the burner and a good correlation between the volatile organic and hydrogen sulfide concentrations and proximity to the gas burner was observed. Very high concentrations of hydrogen sulfide were detected in the burner exhaust by Eutek, Inc. in their January, 1981 study (1). It is strongly recommended that this source of emissions be eliminated. Controlled burning at elevated temperature with longer detention times will result in further oxidation and cracking into simpler and harmless compounds.

Incomplete hydrocarbon oxidation can also lead to the formation of intermediate oxidation products such as aldehydes, which are objectional pollutants in themselves, and other highly toxic gases. Other solutions to this problem include application of an afterburner or scrubbing the effluent gas for further treatment (e.g. ozonation).

The temperature maintained in the combustion section of an afterburner has a significant effect on the degree of oxidation of hydrocarbons. For a properly designed afterburner, the efficiency of hydrocarbon oxidation usually falls within the following ranges:

EFFICIENCY (%)	AVERAGE TEMPERATURE RANGE (°F)
75-85	1100-1200
85-90	1150-1250
90-100	1200-1400

These temperature ranges are useful only as guidelines since a number of other factors strongly influence the oxidation efficiency. Among these are the residence time and the degree of mixing, as might be expected, as well as the type of hydrocarbon in the polluted effluent gas stream, the concentration of the hydrocarbons to be controlled, and the type of burner. The accuracy of the measured temperature in the afterburner must also be taken into account. The efficiency of burning CO is also affected by temperature (4).

Another major source of odor emissions in the landfill is the liquid waste disposal wells, especially the sulfuric acid wells. This study showed that intensity of odor as well as hydrogen sulfide concentrations close to these wells were fairly high. The acid wells have since been shut down and are no longer in use.

HYDROGEN SULFIDE (Feb. 6, 1981, 6-10 PM Sampling Period)

The primary objective of this sampling was to determine if improvements in landfill odor and volatile organic emissions control occured during the course of the study. Actions taken by the BKK Corporation which may have had an effect on the reduction of downwind odor and volatile organic concentrations include the following:

- Shut down of acid disposal wells
- Expansion of gas recovery system
- Placing of additional cover and grooming of slopes
- Rejection of odorous waste loads

Figure 9 shows a significant reduction in hydrogen sulfide concentrations near the working face. The high concentrations detected at Station L_1 indicate that the gas burner and the acid well are probable point sources of hydrogen sulfide emissions. These emissions are probably due to incomplete combustion in the gas burner and leakage from the acid well which was shut down prior to this sampling period. A significant reduction of hydrogen sulfide concentrations occurred in the residential area; levels were below the detection limit at sampling stations R_1, R_4, R_5, and R_7 and very low concentrations were detected at stations R_2 and R_3 during the Feb. 6, 1981 sampling period.

VOLATILE ORGANICS (Jan. 8, 1981, 1-4 PM Sampling Period)

Figure 10 shows that total volatile organic concentrations were slightly reduced at the working face but increased significantly at the gas burner indicating poor combustion efficiency. Concentration levels in the residential area were only slightly reduced compared to the Nov. 1979 - June 1980 sampling period.

CARCINOGENS (Jan. 8, 1981, 1-4 PM Sampling Period)

Figure 11 shows the distribution of total carcinogens (benzene and chloroform) at BKK and the surrounding residential area during the two sampling periods. A significant reduction of carcinogen concentrations was detected near the working face. Only a very slight reduction in concentration levels was observed near the gas burner. Carcinogen concentrations near the closed acid well were quite high while levels in the residential area were relatively unchanged.

CHLORINATED HYDROCARBONS (Jan. 8, 1981, 1-4 PM Sampling Period)

Figure 12 shows that the concentration of chlorinated hydrocarbons increased slightly at the working face while levels were reduced by a small smount at the gas burner. Chlorinated hydrocarbon concentrations were relatively low in the residential area during both sampling periods: a slight reduction in concentration levels was observed during the Jan. 8, 1981 sampling period.

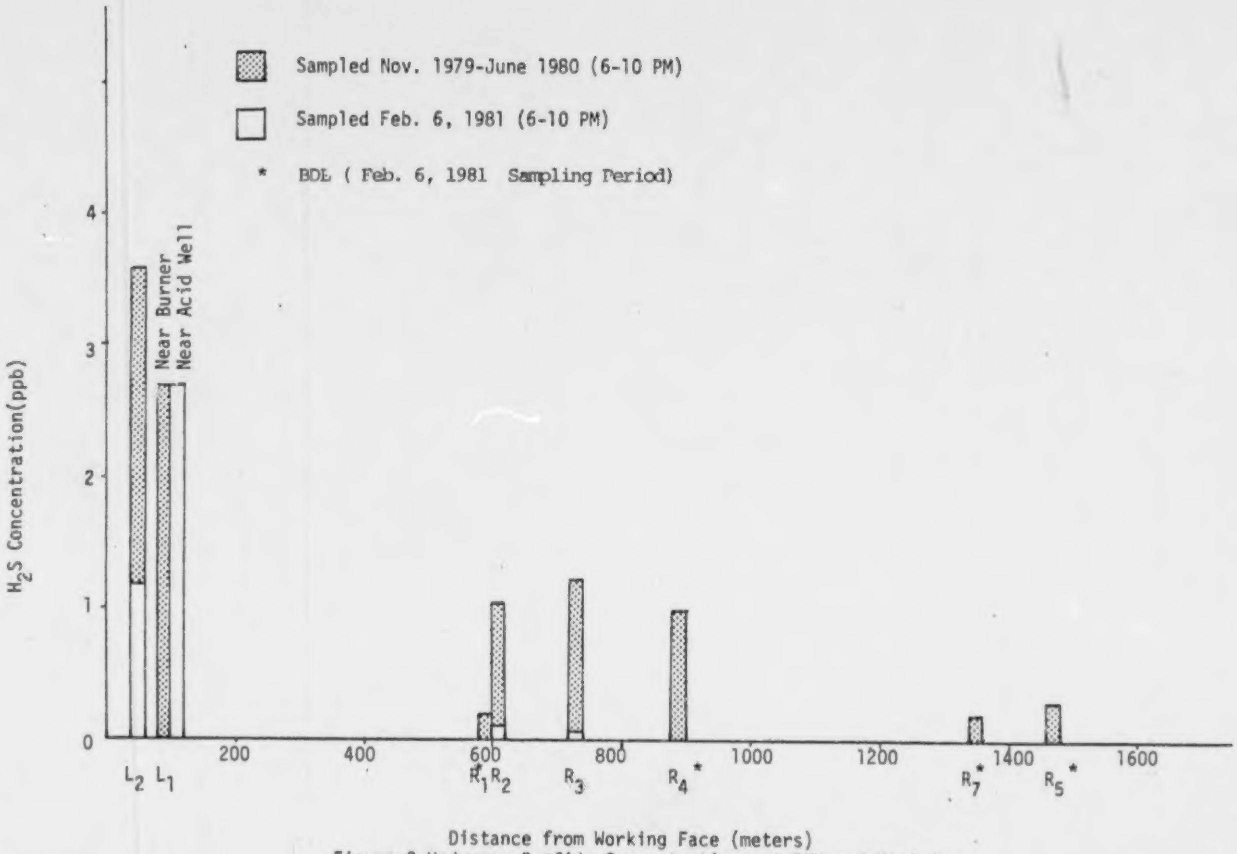
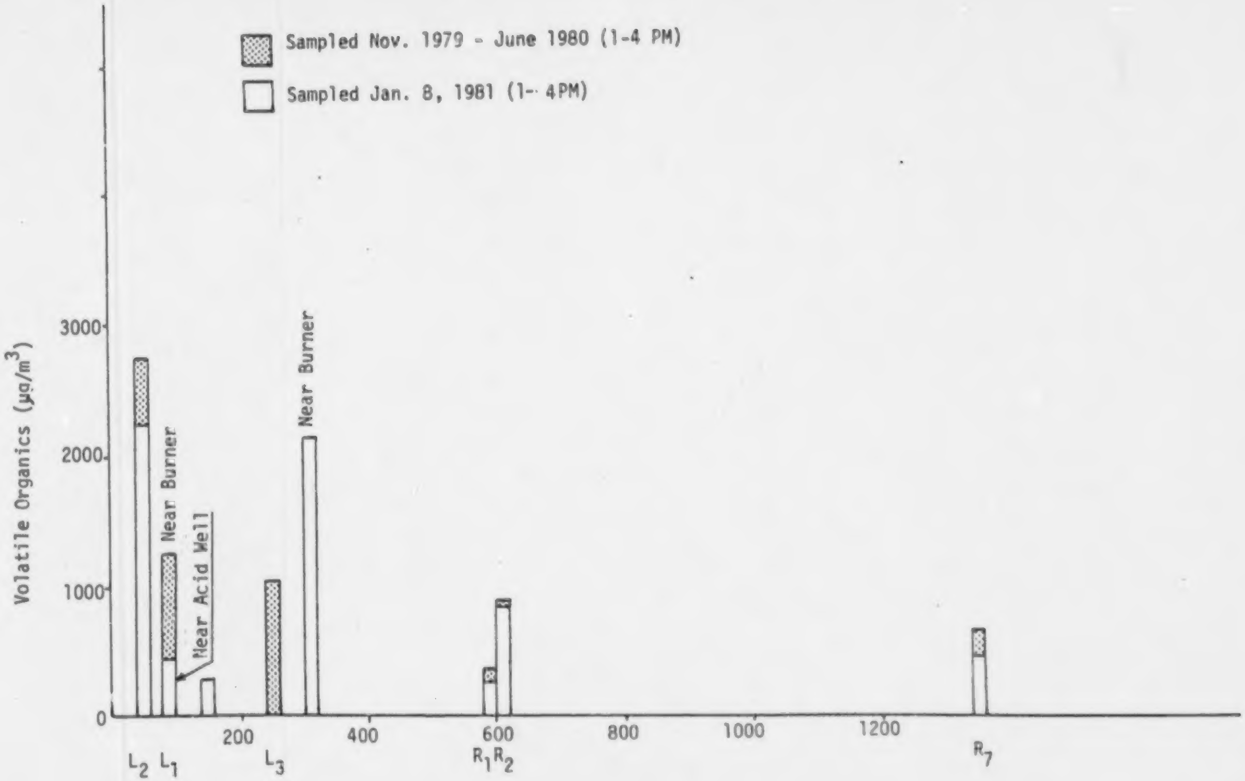
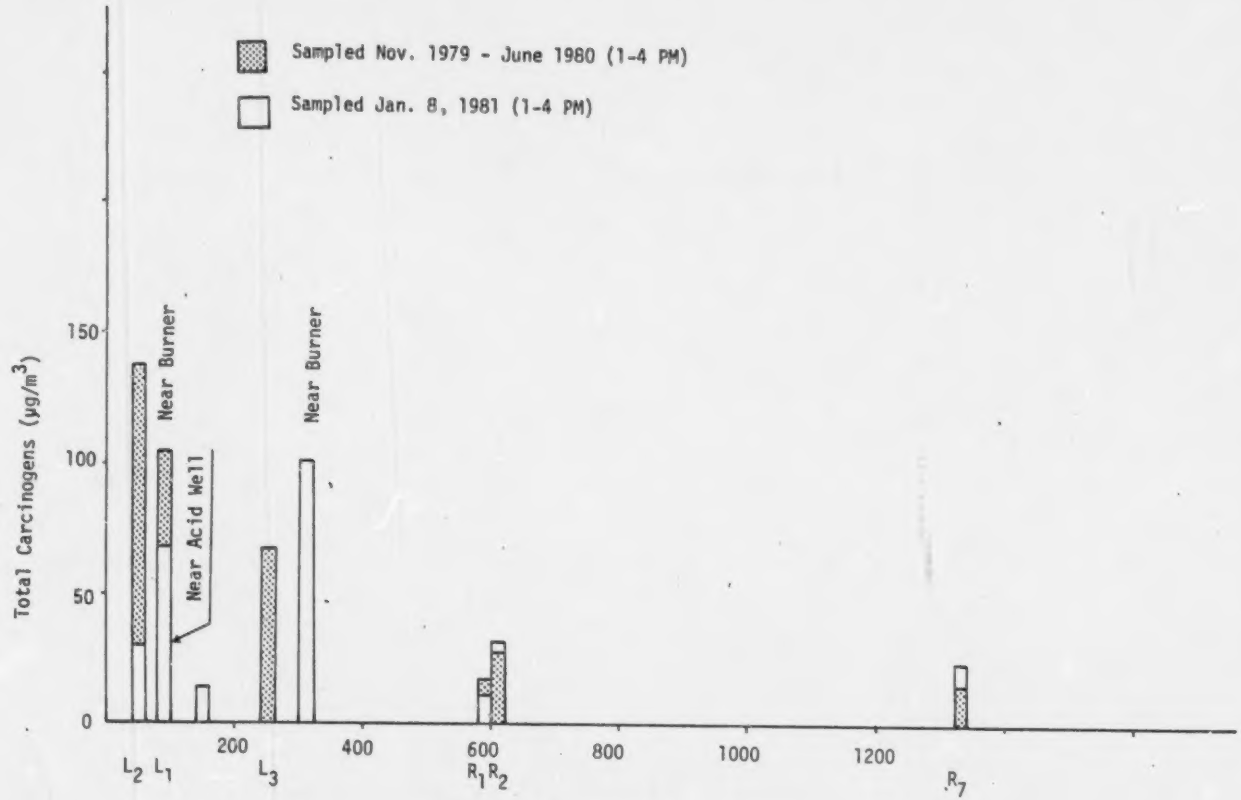


Figure 9 Hydrogen Sulfide Concentrations at BKK and Vicinity



Distance from Working Face (meters)
Figure 10 Average Volatile Organic Concentrations at BKK and Vicinity



Distance from Working Face (meters)
Figure 11 Total Carcinogens at BKK and Vicinity

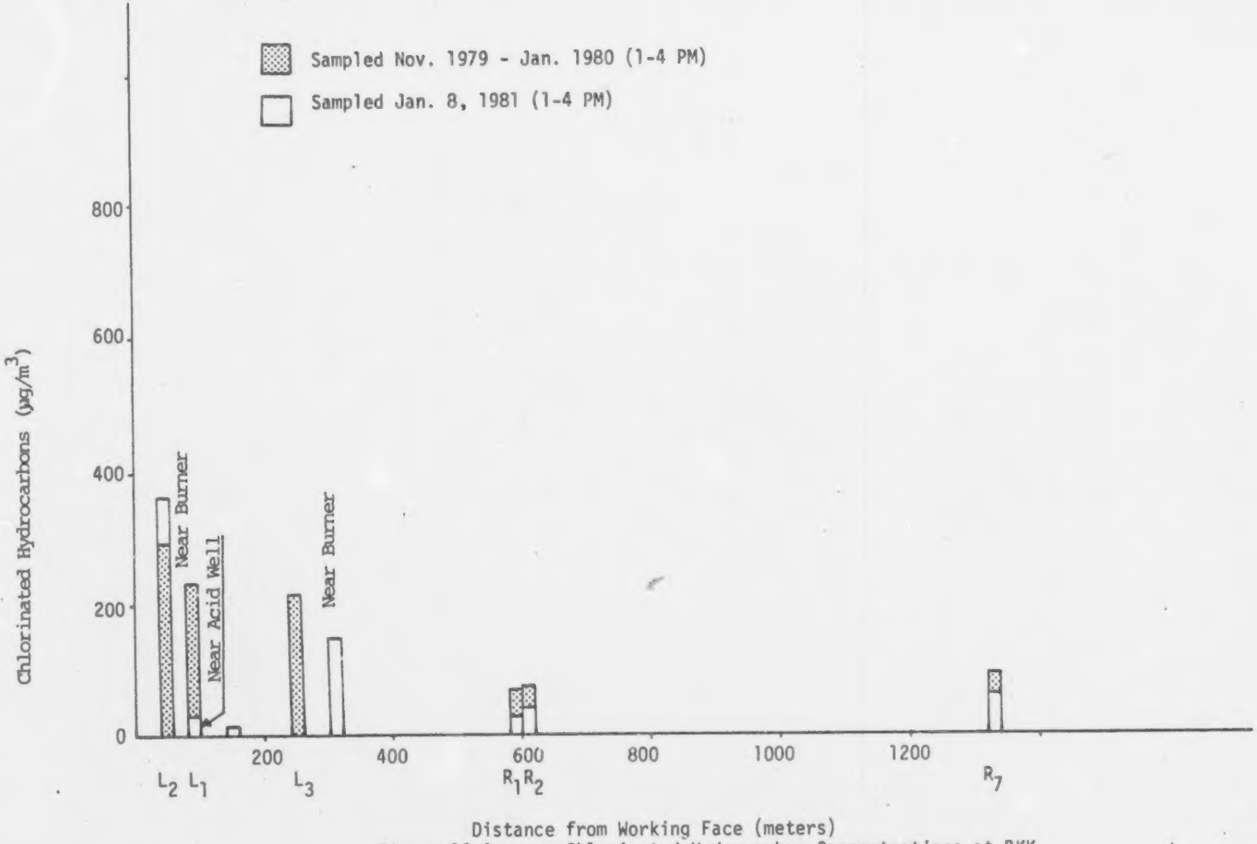


Figure 12 Average Chlorinated Hydrocarbon Concentrations at BKK and Vicinity

CHLOROFORM AND BENZENE-CONTAINING LIQUID WASTES

The identification of the major sources of chloroform and benzene in incoming liquid wastes at BKK was determined by correlation of the waste description and composition in the California Liquid Waste Hauler Record Manifest with the following known uses and formulations of chloroform and benzene.

Chloroform (2,7)

Chloroform is used in industry as a solvent for fats, greases, gums, adhesives, mineral oils, vegetable oils, waxes, varnishes, rubber, tars, essential oils, alkaloids, cellulose acetate and benzoate, ethyl cellusolve, gutta-percha, halogens, methyl methacrylate, many resins, and a wide range of organic compounds. Miscellaneous uses include as an intermediate in the preparation of dyes, pesticides, and Teflon; fire extinguisher mnfg degreasing electronic circuitry; analytical chemistry. Chloroform has also been used as a fumigant and insecticide. The largest and fastest growing use for chloroform is in the manufacture of monochlorodifluoromethane or Flurocarbon 22 (F-22) which has grown from 18,000 tons in 1960 to 60,000 tons in 1975 when it accounted for approximately 96,000 tons of chloroform consumption (about 80% of the total chloroform output). Approximately 70 to 75% of F-22 is sold for use as a refreigerant. The rest is used to manufacture flurocarbon resin intermediates such as tetrafluoroethylene.

Following the National Cancer Institute findings that chloroform is carcinogenic in mice, the Food and Drug Administration (FDA) prohibited the use of chloroform in drug products (e.g., cough syrups, tooth pastes, linaments, and toothache preparations), cosmetic products, and food contact packaging products in 1976. (41 FR 15026, 15029, April 9, 1976). The EPA has issued a notice of "rebuttable presumption" against continued registration of chloroform-containing pestecides (41 FR 14588, April 6, 1976)

Benzene (2,7)

Benzene is used in industry as a solvent for waxes, oils, resins, rubber, adhesives, plasticizers, varnishes, laquers, ect. Benzene yields many important chemical intermediates which are raw materials for the preparation of a large number of organic chemicals. Benzene is used primarily as a chemical raw material in the synthesis of styrene (polystyrene plastics and synthetic rubber), phenol (phenolic resins),cyclohexane(nylon), aniline, maleic anhydride (polyester resins), alkylbenzenes (detergents), chlorobenzenes, and other products used in the manufacture of drugs, dyes, insecticides, pesticides, herbicides, plasticizers, surface coatings, adhesives, surfactants, lubricating additives, heat transfer fluids, explosives, polyurethane elastomers, and alkyd, epoxy, and polycarbonate resins.

Although petroleum was known to contain benzene, recovery of this material was not undertaken on a commercial scale until about 1941. Benzene, along with other light aromatic hydrocarbons such as toluene and xylene is a component of motor gasoline, Benzene is added to gasoline because of its high octane and its tendency to reduce starting difficulties. Since 1970 the mandatory reduction in the lead content of gasoline has produced an increased demand for benzene. The result has been a decline in the percentage of reformate going to aromatics separation plants. United States production of benzene in 1975 was approximately 3,500,000 tons.

SOURCES of BENZENE and CHLOROFORM IN BKK LIQUID WASTES

A total of 1344 manifests covering the period from Oct. 31 to Nov. 17, 1980 (15 disposal days) was examined for this phase of the study. These manifests represent an average of 327,000 gal/day of liquid waste contributed by 380 waste producers. It is believed that the time period covered, the volume of liquid waste, and the number of waste producers considered in this study, are representative of the regional industrialization discharging to the BKK Class I landfill site.

Industry Types

The 1344 manifests are categorized into 11 designated industry types as shown in Table 6. Table 6 shows that approximately 34% of the total volume of liquid waste discharged to BKK was generated by the petroleum industry (i.e., refinery, tank sludge, drilling) The metal industry (metal plating, cleaning, fabricated metal products) contributed about 24%. About 18% was generated by general industry tank sludge and cleaning. Chemical manufacturing produced about 12%. Miscellaneous/unknown industries, equipment cleaning, and plastic manufacturing each contributed 5% or less of the total volume.

Industrial Sources of Benzene and Chloroform

A classification system (source code) was utilized to designate the relative presence or absence of benzene and chloroform-containing hazardous wastes for the 11 representative industry types as shown in Tables 7 to 10. A summary of the pertinent data listed in these tables is presented.

Tables 7 and 8 show that 16,000 and 17,000 gal/day representing 4.80 and 5.10% of the total daily volume, respectively, of unknown benzene and chloroform-containing wastes cannot be determined because of insufficient information in the manifest.

Table 9 shows that benzene in the petroleum industry liquid wastes may approach 100% (possible and probable). This is to be expected in consideration of benzene's ubiquitous presence in crude oils and refinery byproducts. Other high percentage benzene-containing industrial wastes are: plastic manufacturing (99%) fabricated metal products (88%); chemical mnfg (66%); and general industry tank sludge and cleaning (52%). Equipment cleaning and unknown industry may contain approximately 37% and 33% respectively. Misscelaneous industry is about 14% and the metal plating, etching industry has an expected low value of approximately 7%.

TABLE 6 - Industry Types Discharging to BKK Class I Landfill Site

Code	Industry Type	Avg gal/day	%Total Volume
1	Petroleum refining	79,300	24.2
2	Tank Bottom sludge/cleaning (petroleum industry)	13,600	4.16
3	Petroleum production (drilling)	17,500	5.34
4	Tank bottom sludge/cleaning (general industry)	57,900	17.7
5	Metal plating, etching, cleaning	65,100	19.9
6	Fabricated metal products	13,200	4.04
7	Plastic Manufacturing	3,370	1.03
8	Equipment cleaning	9,730	2.96
9	Chemical manufacturing/processing	40,400	12.4
10	Miscellaneous industry	17,600	5.38
11	Unknown industry	9,470	2.89
	Total	327,170	100.00

TABLE 7 - Industrial Sources of Benzene

Industry Code (See Table 1)	Avg. gal/day Source Code*				
	0	1	2	3	2 + 3
1	0	0	0	79,300	79,300
2	0	0	0	13,600	13,600
3	0	0	15,500	1,960	17,500
4	5,440	22,200	11,200	19,100	30,200
5	566	60,000	247	4,260	4,510
6	1,180	370	985	10,700	11,700
7	0	27	1,100	2,250	3,340
8	2,330	3,810	477	3,110	3,590
9	3,070	10,700	10,300	16,300	26,700
10	85	15,100	1,610	808	2,420
11	3,170	3,140	871	2,280	3,150
Total gal/day	15,841	115,347	42,290	153,668	196,040
%Total daily volume	4.80	35.3	12.9	47.0	59.9

* Source Code:

0 Cannot determine because of insufficient information in manifest
1 Unlikely presence
2 Possible presence
3 Probable presence

TABLE 8 - Industrial Sources of Chloroform

Industry Code (See Table 1)	Avg. gal/day Source Code*				
	0	1	2	3	2 + 3
1	0	76,700	1,670	952	2,620
2	0	12,400	1,240	0	1,240
3	0	17,500	0	0	0
4	5,390	36,100	15,100	1,330	16,400
5	1,340	63,000	749	0	749
6	1,190	11,600	370	0	370
7	0	27	3,230	118	3,340
8	2,330	6,100	1,090	214	1,300
9	3,230	17,300	8,160	11,800	19,900
10	85	15,800	1,710	0	1,710
11	3,170	5,100	1,200	0	1,200
Total gal/day	16,735	261,627	34,519	14,414	48,829
%Total daily volume	5.09	80.0	10.5	4.41	14.9

* Source Code:

0 Cannot determine because of insufficient information in manifest
1 Unlikely presence
2 Possible presence
3 Probable presence

TABLE 9 - Industrial Sources of Benzene

Industry Code (See Table 1)	%Total Volume Source Code*				
	0	1	2	3	2 + 3
1	0	0	0	100	100
2	0	0	0	100	100
3	0	0	88.8	11.2	100
4	9.40	38.4	19.3	32.9	52.2
5	0.87	92.2	0.38	6.55	6.93
6	8.94	2.80	7.46	80.8	88.3
7	0	0.80	32.5	66.7	99.2
8	23.9	39.2	4.90	32.0	36.9
9	7.60	26.4	25.6	40.4	66.0
10	0.48	85.8	9.17	4.59	13.8
11	33.5	33.2	9.20	24.1	33.3

* Source Code:

0 Cannot determind because of insufficient information in manifest
1 Unlikely presence
2 Possible presence
3 Probable presence

TABLE 10 - Industrial Sources of Chloroform

Industry Code (See Table 1)	%Total Volume Source Code*				
	0	1	2	3	2 + 3
1	0	96.7	2.10	1.2	3.3
2	0	90.9	9.10	0	9.1
3	0	100.0	0	0	0
4	9.3	62.4	26.0	2.3	28.3
5	2.05	96.8	1.15	0	1.15
6	9.0	88.2	2.80	0	2.80
7	0	0.79	95.7	3.51	99.2
8	23.9	62.7	11.2	2.2	13.4
9	8.0	42.7	20.2	29.1	49.3
10	0.48	89.8	9.72	0	9.72
11	33.5	53.8	12.7	0	12.7

* Source Code:

0 Cannot determine because of insufficient information in manifest
1 Unlikely presence
2 Possible presence
3 Probable presence

Table 7 shows that 196,000 gal/day (59.9% of total daily volume) may contain benzene (possible and probable). Of this total volume, the petroleum industry is the largest contributor at 110,000 gal/day, followed by general industry tank sludge and cleaning (30,000 gal/day), chemical manufacturing (27,000 gal/day), and fabricated metal products (12,000 gal/day). The miscellaneous, unknown industries, equipment cleaning, plastic manufacturing, and metal plating, etching each produces less than 5000 gal/day of benzene - containing liquid wastes.

Table 10 shows that 99% of plastic manufacturing wastes may contain chloroform (possible and probable). Chemical manufacturing may contribute 49% followed by general industry tank sludge (28%), equipment cleaning (13%), and unknown industry (13%). The petroleum industry, miscellaneous industry, metal plating, etching, and fabricated metal products each contribute less than 10% of chloroform containing wastes.

Table 8 shows that approximately 49,000 gal/day (14.9% of total daily volume) may contain chloroform (possible and probable). Of this total volume, chemical manufacturing and processing is the largest producer at 20,000 gal/day, followed by general industry tank sludge and cleaning (16,000 gal/day). The petroleum industry, metal industry, plastic manufacturing, equipment cleaning, miscellaneous and unknown industries each contribute less than 4,000 gal/day of chloroform-containing liquid wastes.

The California Liquid Waste Hauler Record (Manifest) is utilized for recording all liquid and/or hazardous wastes transported to landfill disposal sites. The manifest must be carried by all hauler of hazardous wastes whether said hazardous waste is a liquid, solid, or sludge. Manifest requirements for the waste producer include: (1) specific hazardous chemicals that may be present as components in various waste types must be listed; (2) the presence of any hazardous properties associated with the waste load must be indicated; and (3) the total volume of the waste whether in bulk forms or in containers must be specified. A review of the manifests included in this study shows that many waste producers did not comply with the manifest requirements.

Table 11 shows that 36% of the manifests did not list specific hazardous chemicals present as components in various waste types. For designated industry types, the petroleum industry had a non-compliance ranging from 51 to 79% followed by fabricated metal products (73%), unknown industry (51%) equipment cleaning (50%), plastic manufacturing (21%), and chemical manufacturing (15%). Metal plating, etching and miscellaneous industry has a non-compliance of less than 10%.

Table 11 shows that 15% of the manifests did not indicate the presence of any hazardous properties associated with the waste load. Non-compliance of designated industry types ranges from 6.5% (chemical manufacturing) to 54% (fabricated metal products).

Table 11 shows that 9% of the manifests did not specify the total volume of the waste. Non-compliance of designated industry types ranged from 5% (petroleum refining) to 20% (unknown industry).

The listing of specific hazardous chemicals present as components in various waste types is essential for a more definitive categorization of possible and probable benzene and chloroform-containing wastes. The results of the study show that the percentage of possible benzene and chloroform containing wastes is significantly larger than those wastes which probably contain benzene and chloroform. The high percentage of benzene and chloroform wastes in the possible category is due primarily to improperly completed manifests prepared by the waste producers.

Manifests which do not list specific chemicals in the waste or do not indicate the possible hazardous properties associated with the waste may result in the mixing of incompatible wastes which can produce hazardous situations through heat generation, fires, explosions, or release of toxic substances. For example, the inadvertant mixing of a chloroform-containing waste with strong oxidizing agents, e.g., chromic acid, would result in the formation of phosgene, a very poisonous gas used as a chemical warfare agent in World War I.

The California Regulatious and Guidelines for the Handling of Hazardous Wastes states "An operator of a hazardous waste facility shall not accept any waste material which he believes to be hazardous unless a properly completed manifest which accurately identifies the waste is submitted by the hauler" (8). As previously noted, Table 11 shows that approximately 36% of the reviewed manifests did not properly identify the waste components. It is strongly recommended that State Department of Health Services uniformly enforces the stipulated regulation pertaining to manifests.

TABLE 11 NON-COMPLIANCE WITH MANIFEST REQUIREMENTS

Industry Code (see Table 1)	No. Manifests	%Non-Compliance Manifest Code*		
		1	2	3
1	281	50.5	17.1	5.3
2	47	78.7	23.4	10.6
3	60	71.7	16.7	8.3
4	268	47.0	23.9	7.5
5	277	6.1	11.2	6.9
6	48	72.9	54.2	16.7
7	19	21.1	15.8	5.3
8	52	50.0	23.1	19.2
9	170	14.7	6.5	9.4
10	73	9.6	15.1	11.0
11	49	51.0	32.7	20.4
Total Manifests	1344			
Avg. % Non-Compliance		36.2	14.7	8.7

* Manifest Code

1. Components of hazardous waste omitted or not clearly specified
2. Hazardous properties of waste not specified
3. Total volume of waste not indicated by producer

IV CONCLUSIONS AND RECOMMENDATIONS

The results obtained in this study were obtained from three sampling periods: Nov. 1979 - June 1980, Jan. 8, 1981, and Feb 6, 1981. The major findings of this report are summarized as follows:

1. The nature of odor emissions is intermittant and depends to a great extent on meterological conditions. Among the climatological parameters, wind direction and velocity, rainfall, and the presence of a low night-time inversion showed a definite correlation with the number of received complaints.

2. The working face and the gas burner are the major point sources of odor. Hydrogen sulfide was found to be the major identifiable odorous substance. High concentrations of hydrogen sulfide were also detected near the acid well which had been shut down prior to the sampling period. Emissions from the acid well may be due to a leaking well cap or to unsealed fissures around the well encasement.

3. A-significant reduction of hydrogen sulfide concentrations was observed in the residential area during the Feb. 6, 1981 sampling period. This reduction of hydrogen sulfide concentration may be due to the seven additional gas recovery wells which were placed in operation on Jan. 14, 1981.

4. The maximum concentration of hydrogen sulfide detected at BKK (5.75 ppb at the working face) is approximately 3500 times lower than the NIOSH standard of 20 ppm (30 mg/m^3). Based on the federal standard, it is concluded that the concentration levels of hydrogen sulfide detected at BKK and the surrounding residential area do not indicate a health hazard.

5. The analytical data clearly show that the working face is the major source of emissions for odor and volatile organic compounds. A good correlation between the concentration of odor, total volatile organics, chlorinated hydrocarbons, suspected carcinogens, and hydrogen sulfide, and proximity to the working face was found during the study. This correlation suggests that one of the techniques in reducing emissions is reduced exposure of the working face through improvement of disposal practices, e.g., reduce the area of the working face and more frequent applications of soil cover. However, this may be difficult in actual operation.

6. The results indicate that the gas burner is a point source of organic emissions. The concentration of volatile organics has been found to be relatively high close to the burner and a good correlation between the organic concentrations and proximity to the gas burner was observed. Total volatile organic concentrations were slightly reduced at the working face during the Jan.8, 1981 sampling period but increased significantly near the gas burner, indicating less than complete combustion efficiency or leaks in the gas system.

7. Threshold Limit Values (TLV) were compared with maximum concentrations of 40 hydrocarbons detected at BKK and its vicinity. The data show that all of the measured maximum hydrocarbon concentrations are many orders of magnitude less than the Threshold Limit Values. Based on individual TLV's it would appear that hydrocarbon levels at BKK do not indicate a health hazard; however, such a conclusion must be viewed with caution. It should be noted that Threshold Limit Values are not intended for use in estimating the toxic potential of continuous uninterrupted exposures or in assessing the health hazards which may associated with exposure to mixtures of two or more substances. However, it should be noted that measured values represent a worst case situation. Due to varying wind direction and other meterologic conditions, an "uninterrupted" exposure condition does not actually exist. The determination of the cumulative and synergistic health effects of hydrocarbon levels measured at BKK and the surrounding residential area is beyond the scope of this study.

8. Total volatile organic concentrations were many orders of magnitude greater than the Federal Ambient Air Qualtiy Standard of 160 $\mu g/m^3$ (0.24 ppm). These concentration levels could lead to adverse effects due to the increased generation of photochemical smog. Unburned hydrocarbon in combination with nitrogen oxide in the presence of sunlight form photochemical oxidants, components of photochemical smog, which have harmful effects on human health and on plants. Incomplete hydrocarbon oxidation can also lead to the formation of intermediate oxidation products such as aldehydes, which are objectional pollutants in themselves.

9. Volatile organic samples were collected prior to the installation of seven additional gas recovery wells on Jan. 14, 1981. These additional gas recovery wells together with the planned expansion of the gas recovery system over the entire site should be instrumental in reducing emissions of volatile organics providing that the gas burners are operating efficiently. It is strongly recommended that this source of volatile organics be eliminated. Controlled burning at elevated temperature with longer detention time will result in further oxidation and cracking of the carcinogenic compounds into simpler and harmless compounds. Other solutions to this problem include application of an after burner or scrubbing the effluent gas for further treatment (e.g. ozonation).

10. Among all the volatile organics identified, benzene, chloroform, and vinyl chloride compounds are known to be carcinogenic in nature. There were no other identifiable suspected carcinogens. The maximum carcinogen concentrations detected at BKK are many orders of magnitude lower than the applicable NIOSH threshold limit values. Based on the federal standards, the concentration levels of benzene, chloroform, and vinyl chloride do not indicate a health hazard.

11. Due to the volatility and biodegradability (persistence) of benzene, chloroform, and vinyl chloride in soil (3 months to 1 year, >2 years, and 2-18 months, respectively), these carcinogens may be released to the atmosphere over an extended period of time. Landfill disposal of benzene, chloroform, and vinyl chloride-containing wastes does not provide for complete containment of these compounds; therefore, carcinogen airborne

emissions are inevitable and depend to a large extent on the prevailing meterological conditions. Alternative methods of treatment and disposal which may be implemented to reduce the migration of benzene, chloroform, and vinyl chloride to the atmosphere include: (1) deep well injection, (2) biological treatment, (3) chemical fixation, and (4) encapsulation.

12. The California Regulations for the handling of hazardous wastes require that the waste producer indicate the presence of any hazardous properties associated with the incoming waste. The reviewed manifests reveal that 15% did not indicate the hazardous properties of the waste. Manifests which do no list specific chemicals or indicate possible hazardous properties of the waste could result in the mixing of incompatible wastes in the landfill resulting in possible fires, explosions, or release of toxic substances.

13. The California Regulations require that an operator of a hazardous waste facility shall not accept any waste material believed to be hazardous unless a properly completed manifest which accurately identifies the waste is submitted by the hauler. Approximately 36% of the manifests reviewed for this study did not accurately identify the waste components. It is strongly recommended that the State Department of Health Services uniformly enforce the provisions of the California Regulations pertaining to manifests. Properly completed manifests will provide for a more orderly and systematic disposal of hazardous wastes.

14. In comparison with existing health standards, it is concluded that the basic problem at BKK and the surrounding residential area is one of aesthetics; adverse effects are caused primarily by the nuisance odor characteristic of hydrogen sulfide. It is believed that substantial improvements in odor and volatile organic emissions can be achieved through implementation of remedial procedures outlined together with increased expansion of the gas recovery system and increased combustion efficiency of the gas burners.

V REFERENCES

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APPENDIX A

TREATMENT AND DISPOSAL OF BENZENE AND CHLOROFORM-CONTAINING WASTES

Although the basic types of treatment and disposal and their applications are widely known, there are substantial differences in the design features that best fit them to specific applications. The effectiveness of alternative treatments cannot be assured realistically unless evaluated against a specific requirement. Relative efficiences of different treatments are a preliminary indication of their utility in a specific situation, but the actual requirements and system pecularities are the only valid basic for selection between alternative methods discussed in this section.

SANITARY LANDFILL DISPOSAL

The potential for escape of hazardous vapors exists even in a well-designed and operated sanitary landfill. Thus, additional precautions over and above those taken during sanitary landfilling of municipal solid wastes are required for land disposal of many hazardous wastes. Certain untreated wastes should never be land disposed because of extreme hazards posed by escape of even small quantities. Due to the volatile nature of benzene (B.Pt. 80.1^{O}c) and chloroform (B.Pt. 61.3^{O}c), these compounds may fall into this category.

The evaporation of chloroform from water at 1ppm at 25°C is 50% after 18-25 minutes and 90% after 60-85 minutes (2). Assuming comparable volatilization rates for benzene, it is likely that the exposed working face during disposal of benzene and chloroform-containing wastes may result in the release of significant quantities of these compounds to the atmosphere. The escape of chloroform to the atmosphere poses the additional potential problem of its oxidation to phosgene gas which is extremely toxic at relatively low concentration levels (5). Some alternative methods of treatment and disposal which may be utilized to reduce the migration of benzene and chloroform to the atmosphere include: (1) deep well injection; (2) biological treatment; and (3) chemical fixation/encapsulation.

DEEP WELL DISPOSAL

Deep well injection of liquid and semi-liquid hazardous wastes can pollute groundwaters unless great care is taken in site selection, construction, and operation of these wells. The EPA subsurface management policy opposes deep well injection unless all other surface disposal alternatives have been found to be less satisfactory (9). Proof of environmental adequacy is a responsibility of the disposer. The difficulty in defining adequacy of well disposal lies in the fact that considerable quantities may be deposited over a number of years before potentially serious problems develop. The most common formations selected for the injection of wastes include inconsolidated sands, limestones, and dolometes.

BIOLOGICAL TREATMENT

Biological treatment processes have been used extensively in treating hazardous wastes. Among the several types of biological systems that have been used are activated sludge, trickling filters, aerated lagoons, and waste stabalization ponds.

The applicability of biologically treating a particular waste is a function of the biological degradability of the dissolved organics present in the liquid waste. When considering the economics of a biological treatment system, the time required to biologically degrade the dissolved organics is of primary importance. The degradation rate of an organic compound is a function of the molecular structure of the compound, the genera and species of microorganisms utilizing it as a food source and the time required for the microorganisms to develop the enzymes necessary for substrate utilization.

Aliphatic or cyclic aliphatics are usually more susceptible to biological degradation than aromatics. Unsaturated aliphatics, such as acrylics, vinyl, and carbonyl compounds are generally biodegradable. Many organic compounds are extremely biodegradable at low concentrations but are bio-static or bio-toxic at higher concentrations (10). The presence of other constituents will affect the biodegradability of benzene and chloroform; therefore, the treatment of such hazardous wastes must be considered on an individual basis. The biodegradability (persistence) of benzene and chloroform in soil is 3 months to 1 year, and < 2 years, respectively. (11)

CHEMICAL FIXATION/ENCAPSULATION

Chemical fixation technology is used to alter the physical state of a particular contaminant such that its potential for leaching and release to the atmosphere is greatly reduced. Chemical fixation of industrial waste materials has been developed by several companies, including: Dravco Corp., I.U. Conversion Systems, and Chemfix, Inc. Although the environmental adequacy of these processes has not been extensively evaluated, the resulting solidified waste sludges are less likely to cause environmental damage than if the wastes was deposited on land without treatment.

In all fixation systems, proprietary chemicals are mixed with the waste sludges, and the resulting mixture is pumped onto the land, where solidification occurs between a few days and a few weeks (depending on the process).

These fixation processes result in a matirx in which wastes are entrapped. The product of fixation is different for the three processes. Chemfix produces a material with soil-like characteristics while Dravo produces a clay-like material, and IU Conversion Systems a clay/concrete type material. The properties of the final product of either process can be changed with a variation in either the addition of fixation materials or sludge properties.

Processes such as these have been used successfully in the treatment of a variety of waste streams, including heavy metal sludges, oil refinery wastes, and lime/limestone wet scrubber sludges. Reduced leaching and airborn emissions should result, but the permanance of the resulting structure and the absolute environmental adequacy of these techniques have not as yet been fully documented. Ideally, such materials should have an effective life greater than the toxic life of the wastes they contain.

Encapsulation is a stabilization process in which dewatered waste sludge is enclosed with a resin, cement, etc. Available materials include concrete, molten asphalt, and plastics (polyurethane, polyester, polyethylene, polybutadiene). A number of systems for casting solidified sludges have been investigated and of these the most commonly used process involves the use of a polybutadiene binder for the sludge followed by application of a thin polyethylene jacket around the sludge mass (12). In some cases, the waste sludge may be encapsulated in drums prior to deposition in the landfill.

The advantages and disadvantages of encapsulation techniques may be summarized as follows:

ADVANTAGES

- The sludges stabilized by such a process are totally isolated from their surroundings, and therefore very soluble and volatile contaminants can be contained.
- Since the coating materials are strong and chemically inert, no secondary container is usually required.

DISADVANTAGES

- The materials used in the process are often expensive.
- The techniques usually require specialized equipment and heat treatment to form the jackets.
- The sludge has to be dried before the process can be applied.
- Certain jacket materials are inflamable.

BKK CORPORATION - LANDFILL DIVISION GENERATOR ACTIVITY SUMMARY FOR THE PERIOD 01/01/83 TO 04/30/83
LISTED IN ORDER OF QUANTITY RECEIVED.

GEN NO	GENERATOR NAME	ADDRESS	TONNAGES HAZ.	NON-HAZ.	TOTAL
58502	POWERINE OIL COMPANY	12354 LAKELAND ROAD SANTA FE SPRINGS CA 90670 (213) 944-6111	3214	6	3220
60850	RSR QUEMETCO INC.	720 S.7TH AVENUE INDUSTRY CA 91745 (213) 330-2294	1831	0	1831
22200	GULF OIL COMPANY J.A. GLASER	P.O. BOX 2487 SANTA FE SPRINGS CA 90670 (213) 921-3581	1737	0	1737
75509	TEXACO, INC	329 N. DURFEE SOUTH ELMONTE CA 91733 ( ) 699-0948	670	0	670
731	AJAX HARDWARE FRANK L. LAMB	825 SOUTH AJAX AVE INDUSTRY CA 91749 (213) 961-1281	454	0	454
70270	SOUTHERN CAL CHEMICAL COMPANY	8851 DICE SANTA FE SPRINGS CA 90670 (213) 698-8036	326	0	326
68050	SCREWCORP/DIV. OF VSI CORP. JIM SCHRECK	13001 E. TEMPLE AVENUE INDUSTRY CA 91746 (213) 338-5501	277	0	277
55810	PACIFIC COAST DRUM	P.O. BOX 3593 SOUTH ELMONTE CA 91723 ( ) 283-0218	203	0	203
86150	WESTERN GEAR HARRY	14724 E. PROCTER INDUSTRY CA 91744 (213) 968-6525	196	7	203
18480	FERRO CORP. PRODUCTOL CHEM.DIV	10051 ROMANDEL AVE. SANTA FE SPRINGS CA 90670 (213) 944-0111	170	0	170
6835	CALIFORNIA INDUSTRIAL PRODUCTS ROBERT ABBEY	11525 SO SHOEMAKER AVE SANTA FE SPRINGS CA 90670 (213) 941-3281	60	104	164
4440	BROWN PACIFIC WIRE INC	13639 E. BORA DR SANTA FE SPRINGS CA 92601 (213) 921-3421	160	0	160
74681	TRW CINCH GRAPHIK MIKE BARNETT,PURCHASING MGR	200 S. TURNBULL CANYON INDUSTRY CA 91746 (213) 333-1201	151	0	151
82040	VACCO INDUSTRIES	10350 VARCO STREET SOUTH ELMONTE CA 91733 (213) 442-7121	149	0	149
53890	OMEGA CHEMICAL CORP STEVE	12504 E WHITTIER BLVD WHITTIER CA 90602 (213) 698-0991	146	0	146
40502	LAKEWOOD OIL SERVICE	P.O. BOX 2282 SANTA FE SPRINGS CA 90670 (213) 863-8755	131	7	138
13040	EMERY INDUSTRIES	8733 SOUTH DICE ROAD SANTA FE SPRINGS CA 90670 (213) 685-5664	22	108	130
6220	CAL-CHEM CLEANING	2036 N.MERCED AVE. SOUTH ELMONTE CA 91733 (213) 442-6784	116	0	116

BKK CORPORATION - LANDFILL DIVISION GENERATOR ACTIVITY SUMMARY FOR THE PERIOD 01/01/83 TO 04/30/83 PAGE 2
LISTED IN ORDER OF QUANTITY RECEIVED.

GEN NO	GENERATOR NAME	ADDRESS	TONNAGES		
			HAZ.	NON-HAZ.	TOTAL
71740	STANDARD PRECISION MIKE MUZZAUN	12311 SHOEMAKER SANTA FE SPRINGS CA 90670 (213) 944-0921	95	0	95
24160	HILL BROS. CHEMICAL COMPANY	15017 E CLARK INDUSTRY CA 91745 (213) 333-2251	75	0	75
1070	AMERICAN CHEMICAL & REFINING BILL BIRCH	12121 E. BARRINGER SOUTH ELMONTE CA 91733 (213) 443-7104	69	0	69
44320	MAGNA CORPORATION	11808 AO. BLOOMFIELD AVE. SANTA FE SPRINGS CA 90670 (213) 863-4781	69	0	69
69020	SIGMA PLATING COMPANY INC DAVE KAREHESKY	1040 OTTERBEIN AVE INDUSTRY CA 91748 (213) 965-2561	67	0	67
8270	CHEMCENTRAL	13900 CARMENTA SANTA FE SPRINGS CA 90670 (213) 773-3471	61	0	61
27520	INDUSTRIAL RUBBER CEMENT	15257 PROCTOR AVE INDUSTRY CA 91745 ( ) - 0	46	15	61
1530	ANCHOR POST PROD	12482 E. PUTNAM WHITTIER CA 90608 (213) 693-2794	60	0	60
74950	TECHALLOY, INC.	15100 SO NELSON INDUSTRY CA 91744 ( ) 330-2211	60	0	60
3015	B.D.P. COMPANY DOLORES MCGUILL	855 ANAHEIM-PUENTE ROAD INDUSTRY CA 91747 (213) 283-6611	55	0	55
76450	TOMADUR ENGINE COMPANY J SPEYER	3737 CAPITOL AVENUE INDUSTRY CA 91747 (213) 723-0371	54	0	54
11170	DIVERSEY WYANDOTTE MILLER GARY	8921 DICE ROAD SANTA FE SPRINGS CA 90670 ( ) 692-3711	52	0	52
46211	MCFARLAND ENERGY EMC	P.O. BOX 3608 SANTA FE SPRINGS CA 90670 ( ) 944-0181	0	50	50
68850	SHORING ENGINEERS	1903 N. DURFEE SUITE 4B SOUTH ELMONTE CA 91733 ( ) 686-1702	7	43	50
19440	FREEBORN EQUIP. MR. SARDRUM	7607 INDUSTRY PICO RIVERA CA 90660 (213) 949-5401	47	0	47
86125	WESTERN GALVANIZING CO., INC.	P.O. BOX 3004 SANTA FE SPRINGS CA 90760 (213) 945-1214	45	0	45
57480	PEAT MANUFACTURING	10700 EAST FIRESTONE NORWALK CA 90605 ( ) - 0	44	0	44
19240	FOSS PLATING CO. INC	8140 SECURA WAY SANTA FE SPRINGS CA 90670 (213) 945-3451	43	0	43

BKK CORPORATION - LANDFILL DIVISION   GENERATOR ACTIVITY SUMMARY FOR THE PERIOD 01/01/83 TO 04/30/83
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GEN NO	GENERATOR NAME	ADDRESS	TONNAGES HAZ.	NON-HAZ.	TOTAL
3645	BERGANDI MANUFACTURING CO.,INC	1520 ADELIA AVE SOUTH ELMONTE CA 90733 ( ) 442-5801	42	0	42
3080	B. K. K. RECOVERY	2210 AZUSA AVENUE WEST COVINA CA 91791 ( ) 965-0911	19	21	40
40500	LAKEWOOD OIL DEL PARKER	11020 BLOOMFIELD SANTA FE SPRINGS CA 90670 (213) 863-8755	29	11	40
46362	MCKESSON CHEMICAL CO.	11600 PIKE ST SANTA FE SPRINGS CA ( ) 699-6013	40	0	40
6890	CALIFORNIA MILK PRODUCTS	11709 EAST ARTESIA ARTESIA CA 90701 (213) 865-1291	0	39	39
63028	H. H. ROBERTSON HAROLD KADOTA	P. O. BOX 1215 INDUSTRY CA 91749 (213) 686-1950	39	0	39
80340	UNIVERSAL PAINT CORP	111 HUDSON AVE INDUSTRY CA 91352 (213) 968-1496	39	0	39
22140	GUARANTEED PRODUCTS	355 VINELAND AVE. INDUSTRY CA 91746 (213) 968-5573	38	0	38
69850	SOABAR CO	12450 E WHITTIER BLVD WHITTIER CA 90602 ( ) 945-1344	38	0	38
561	ADVANCE PIPE PRODUCTS RALPH	12804 E. FIRESTONE BLVD. SANTA FE SPRINGS CA 90670 (213) 921-2507	37	0	37
6395	CAL MILK	11709 ARTESIA ARTESIA CA ( ) - 0	0	37	37
18900	FLINT INK CORP.	13055 E. TEMPLE AVE. INDUSTRY CA 91746 (213) 962-7067	35	0	35
20200	GAFFERS AND STATTLER INC.	245 N. VINELAND INDUSTRY CA 91744 (213) 330-6878	33	0	33
41221	LEFIELL MFG. CO	13700 FIRESTONE BLVD SANTA FE SPRINGS CA 90670 ( ) 733-0260	23	10	33
42350	LYCO FOODS JEFF HAACK	13220 CAMBRIDGE SANTA FE SPRINGS CA 90670 (213) 921-5757	33	0	33
840	ALLFAST FASTENERS	15252 DON JULIAN INDUSTRY CA 91744 (213) 968-9388	32	0	32
72210	STEVEN'S CONSTRUCTION	10343 RUSH STREET SOUTH ELMONTE CA 91733 ( ) 443-0105	32	0	32
2092	ATLANTIC RICHFIELD	14000 E. LAMBERT WHITTIER CA 90605 ( ) 698-6128	30	0	30

BKK CORPORATION - LANDFILL DIVISION GENERATOR ACTIVITY SUMMARY FOR THE PERIOD 01/01/83 TO 04/30/83 PAGE 4
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GEN NO	GENERATOR NAME	ADDRESS		TONNAGES		
				HAZ.	NON-HAZ.	TOTAL
11015	DIESEL RECON CO. ALAN ENSLEY	14044 FREEWAY DR. SANTA FE SPRINGS	CA 90670 (212) 802-7831	29	0	29
86900	WHITCOMB PLATING	655 S. ALDERTON INDUSTRY	CA 91744 (213) 965-4960	29	0	29
210	A & E PLASTICS USE GENERATOR #00209	14505 PROCTOR INDUSTRY	CA 98749 (213) 968-3801	28	0	28
12100	EASTMAN KODAK COMPANY MARTIN F ZEGARILLI	12100 RIVERA RD WHITTIER	CA 90606 (213) 945-1255	28	0	28
20600	GENERAL BATTERY	13110 LOUDEN LANE INDUSTRY	CA 91744 (213) 960-6402	28	0	28
1990	ASSOCIATED PLATING	9636 ANN STREET SANTA FE SPRINGS	CA 90670 (213) 945-3555	27	0	27
7935	CENTURY WIRE & CABLE	7633 SO. PARAMOUNT PICO RIVERA	CA 90660 (213) 949-5481	27	0	27
21624	GORHAM BRONZE	16961 E. GALE AVE INDUSTRY	CA ( ) - 0	27	0	27
59530	QUAKER CITY PLATING	7937 CHATFIELD WHITTIER	CA 90606 (213) 693-9027	27	0	27
61450	REDI-STRIP CO., INC. R L DERINGER	11007 FOREST PLACE SANTA FE SPRINGS	CA 90670 (213) 944-9915	26	0	26
69988	SONIC PLATTING CO., INC.	13002 LOS NIETOS ROAD SANTA FE SPRINGS	CA 90670 ( ) 944-6674	26	0	26
1274	AMERICAN REFINER, INC.	801 BALDWIN PARK BLVD. INDUSTRY	CA 91746 ( ) 960-5402	25	0	25
23200	HALLIBURTON SERVICES	P O BOX 2947 SANTA FE SPRINGS	CA 90670 (213) 863-8701	23	0	23
56690	PAINT & COATINGS CORPORATION JOSE BORNEO	251 MASON WAY INDUSTRY	CA 91746 (213) 333-4592	23	0	23
59100	PYRO ENGINEERING	14801 SO. ANSON AVE SANTA FE SPRINGS	CA 90670 ( ) 802-2463	5	18	23
7240	CARBCO IND TOM BAGGOTT	14761 CARMENITA NORWALK	CA 92802 (213) 621-2620	22	0	22
51540	NORRIS INDUSTRIES	7755 PARAMOUNT PLACE PICO RIVERA	CA 90660 ( ) 949-2575	22	0	22
11815	DUREX	10943 SCHMIDT SOUTH ELMONTE	CA 91731 (213) 442-0962	21	0	21

BKK CORPORATION - LANDFILL DIVISION GENERATOR ACTIVITY SUMMARY FOR THE PERIOD 01/01/83 TO 04/30/83
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GEN NO	GENERATOR NAME	ADDRESS	TONNAGES HAZ.	NON-HAZ.	TOTAL
70031	SONOCO PROD.	12851 LEYVA NORWALK CA 90650 (213) 921-0881	21	0	21
48320	MODINE MANUFACTURING COMPANY	12252 E. WHITTIER BLVD WHITTIER CA 90602 ( ) 693-8261	20	0	20
66450	SAFE PLATING, INC.	12015-L SLAUSON SANTA FE SPRINGS CA 90670 (213) 696-2131	19	0	19
67660	SARGENT INDUSTRIES	15350 STAFFORD ST INDUSTRY CA 91747 ( ) 961-3521	12	7	19
10456	DEACON JONES DEV. CORP.	4429 WEST CENTURY BLVD. INDUSTRY CA ( ) 671-6855	18	0	18
23760	HELENE CURTIS	19161 EAST WALNUT DRIVE INDUSTRY CA ( ) - 0	18	0	18
48195	MODERN COVER ALL	16434 PIONEER BLVD NORWALK CA 90650 ( ) 926-2377	18	0	18
51150	NEVILLE CHEMICAL COMPANY	12800 E. IMPERIAL HWY. SANTA FE SPRINGS CA 90670 (213) 864-2707	18	0	18
76354	L.A. TIMES	14011 MARQUARDT SANTA FE SPRINGS CA ( ) - 0	18	0	18
76480	TOOL&JIG PLATING	7635 BALDWIN PLACE WHITTIER CA 90602 ( ) - 0	18	0	18
1840	ARMCO NATIONAL	9100 NORWALK BLVD. SANTA FE SPRINGS CA ( ) - 0	0	17	17
8100	CHALLENGE COOK BROS.	15421 GALE AVE INDUSTRY CA 91745 (213) 330-0666	0	17	17
20087	GNB BATTERY	14500 E. NELSON INDUSTRY CA ( ) - 0	17	0	17
40750	LANSCO DIE CASTINGS	711 STIMSON AVENUE INDUSTRY CA 91744 ( ) 961-2441	0	17	17
58000	PICO RIVERIA PLATING COMPANY	9307 BERMUDEZ PICO RIVERA CA 90660 ( ) 723-5060	17	0	17
68941	SIERRA PACIFIC CONSTRUCTION CO	19635 E. WALNUT DR INDUSTRY CA 91789 (714) 594-2741	17	0	17
9075	CONSOLIDATED DEVICES INC.	19220 SAN JOSE INDUSTRY CA ( ) 965-0668	16	0	16
11700	DUBOIS CHEMICALS	15010 E. DON JULIAN INDUSTRY CA 91749 (213) 961-6305	16	0	16

BKK CORPORATION - LANDFILL DIVISION GENERATOR ACTIVITY SUMMARY FOR THE PERIOD 01/01/83 TO 04/30/83
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GEN NO	GENERATOR NAME	ADDRESS		TONNAGES		
				HAZ.	NON-HAZ.	TOTAL
55760	P.S.I. WEST	255 SOUTH 7TH AVE INDUSTRY	CA 91744 (213) 968-9669	15	0	15
75189	TELEDYNE PICCO	16800 CHESTNUT ST. INDUSTRY	CA 91748 ( ) 961-0711	15	0	15
3123	B.P.S. INDUSTRIE	13250 AMAR ROAD INDUSTRY	CA 91746 ( ) 337-1255	0	14	14
50670	NATIONAL SPONGE DIV. (G.F.I.)	8320 REX ROAD PICO RIVERA	CA 90660 ( ) 728-0151	14	0	14
7039	CALMAR	333 TURNBULL CANYON RD INDUSTRY	CA 91749 ( ) 230-3161	13	0	13
21740	GOULD BATTERY INC SAM BRUMFIELD	P. O. BOX 1567 INDUSTRY	CA 91749 (213) 336-4571	13	0	13
22105	GROHAM-BRONZE	16961 E. GALE INDUSTRY	CA ( ) 964-6547	13	0	13
45731	MATTEL, INC.	13060 E. TEMPLE AVE INDUSTRY	CA 91746 ( ) 962-4471	13	0	13
54865	OVERTON LABS	230 9TH ST INDUSTRY	CA ( ) - 0	13	0	13
57650	PEPSI COLA BOTTLING COMPANY	4416 NORTH AZUSA CANYON RD BALDWIN PARK	CA 91706 ( ) 338-5531	13	0	13
58005	PILOT CHEMICAL	11756 BURKE ST. SANTA FE SPRINGS	CA 90670 (213) 723-0036	13	0	13
6549	CAL TRANS	1940 SOUTH WORKMAN MILL ROAD WHITTIER	CA 90601 ( ) 695-4112	12	0	12
9970	CYCLONE EXCELSWELD ART SCHLAB	14604 ARROW HIGHWAY BALDWIN PARK	CA 91706 (213) 962-2437	12	0	12
10915	THE DIA-LOG CO.	P.O. BOX 4008 WHITTIER	CA 90607 ( ) - 0	12	0	12
12690	ELECTRO-CAL-PLATING CORP. USE #12691	12831 MARQUARDT SANTA FE SPRINGS	CA 90670 ( ) 921-2555	12	0	12
58680	PRECISION TUBE BENDING E.L. WOODRUFF	13623 TALE ST. SANTA FE SPRINGS	CA 90670 ( ) 723-8804	12	0	12
59055	PUENTE HILLS LANDFILL	2800 WORKMAN MILL WHITTIER	CA 90601 ( ) 699-3376	7	5	12
77190	TREASURE CHEST	15354 STAFFORD INDUSTRY	CA 91744 (213) 968-8541	12	0	12

BKK CORPORATION - LANDFILL DIVISION

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GEN NO	GENERATOR NAME	ADDRESS	TONNAGES HAZ.	NON-HAZ.	TOTAL
9935	CUTTER LABORATORY	15320 E. SALT LAKE INDUSTRY CA 91746 ( ) 968-8561	0	11	11
57490	PECK ROAD FORD	2450 KELLA AVE WHITTIER CA 90601 (213) 692-7267	11	0	11
59062	PUREX CORPORATION BILL ARTHUR	18400 MOHR AVE INDUSTRY CA 91748 ( ) 965-1551	11	0	11
87925	WYNDHAM MANUFACTURING	10640 SOUTH PAINTER SANTA FE SPRINGS CA 90670 (213) 944-3261	11	0	11
2212	ATLAS RADIATOR	10122 NORWALK SANTA FE SPRINGS CA 90670 (213) 944-6185	10	0	10
43232	LUCKY STORE BEVERAGE PLANT	4800 GRAGG RD. PICO RIVERA CA 90660 ( ) 692-7744	10	0	10
62830	ROADWEST OILCOM.	8643 SHOEMAKER WHITTIER CA 90602 ( ) 693-9881	10	0	10
936	ALUM-A-COAT	9850 KALE SOUTH ELMONTE CA 91733 ( ) - 0	9	0	9
990	AMERDYNE WEST	9629 E. BEVERLY BLVD PICO RIVERA CA 90660 (213) 692-5212	0	9	9
23285	HANSON DIST. CO.	1903 TYLER AVENUE SOUTH ELMONTE CA 91731 (213) 448-4683	9	0	9
40346	LA MIRADA DYE	15228 BONA SANTA FE SPRINGS CA ( ) - 0	0	9	9
68930	SIERRA FASTENERS	8445 WARVOLE STREET PICO RIVERA CA 90660 ( ) 949-7901	9	0	9
935	ALUM-A-COAT KEN	2439 SEAMAN AVE SOUTH ELMONTE CA 91733 (213) 448-2000	8	0	8
8195	W. I. CHAPMAN COMPANY	950 TURNBULL CANYON ROAD INDUSTRY CA 91745 (213) 968-1421	0	8	8
18007	F.S.A. REBUILDER	8230 INDUSTRY WAY PICO RIVERA CA 90660 ( ) - 0	8	0	8
70105	SOSO INT. CORP.	220 NORHT CALIF. AVENUE INDUSTRY CA ( ) 961-3591	8	0	8
495	ACME LIGHTING	18401 ARENTH STREET INDUSTRY CA 91748 (213) 965-0711	7	0	7
19608	FULLER O'BRIAN PAINTS	14434 BEST AVENUE SANTA FE SPRINGS CA ( ) 921-0771	7	0	7

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48450	MONAD/CK COMPANY	18301 E. ARENTH INDUSTRY CA 91747 (213) 964-6581	7	0	7
50850	NAUGLES RESTAURANT	11879 ARTESIA BLVD ARTESIA CA 90701 ( ) 865-3953	0	7	7
62875	ROBERTS CONSOLIDATED	600 N. BALDWIN PARK BL. INDUSTRY CA 91749 ( ) 238-7311	0	7	7
69019	SIGMA CASTING	925 CHARICE INDUSTRY CA 91768 (213) 965-5957	7	0	7
72349	STOODY COMPANY WRAP DIVISION	11804 WAKEMAN STREET SANTA FE SPRINGS CA 90670 (213) 698-9506	7	0	7
77440	TRIDENT CONSOLIDATED,INC	18751 E. RAILROAD AVE INDUSTRY CA 91248 ( ) - 0	0	7	7
81120	USARY SHELL	13203 TELEGRAPH RD SANTA FE SPRINGS CA ( ) - 0	0	7	7
259	CC CASTING COMPANY, INC.	11126 GREENSTONE AVE SANTA FE SPRINGS CA 90670 ( ) 946-4381	6	0	6
530	ADAMS RITE	4040 CAPITAL INDUSTRY CA ( ) - 0	6	0	6
1919	ARTHUR KAJIWARA EQUIPMENT CO	2205 TROY AVENUE SOUTH ELMONTE CA 91733 (213) 686-0800	6	0	6
3790	BETTIS RUBBER COMPANY	12519 PUTNAM STREET WHITTIER CA 90602 (714) 723-8551	6	0	6
47540	MID WEST FAB. COMPANY JOE ROPPERT	8623 DICE ROAD SANTA FE SPRINGS CA 90670 ( ) 698-9615	6	0	6
74910	TEAM CORPORATION	9949 HAYWARD ST SOUTH ELMONTE CA 91733 ( ) 442-3240	2	4	6
3740	BEST FOODS	15700 SHOEMAKER SANTA FE SPRINGS CA 90670 (213) 921-7411	5	0	5
4828	BYCO CO.	19400 S. JOSE AVE. INDUSTRY CA ( ) - 0	5	0	5
6400	CAL MOLD, INC.	17425 RAIL ROAD STREET INDUSTRY CA 91744 (714) 545-5503	5	0	5
6583	CAL-WESTERN PAINT INC.	11748 E. SLAUSON AVE SANTA FE SPRINGS CA (213) 723-6362	0	5	5
7955	CERRITOS AUTO BODY DICK BELL	11656 ARTESIA BOULEVARD ARTESIA CA 90701 (213) 860-4448	0	5	5

BKK CORPORATION - LANDFILL DIVISION GENERATOR ACTIVITY SUMMARY FOR THE PERIOD 01/01/83 TO 04/30/83
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GEN NO	GENERATOR NAME	ADDRESS	TONNAGES		
			HAZ.	NON-HAZ.	TOTAL
10220	DARCO, INC.	15629 CLANTON CIRCLE SANTA FE SPRINGS CA 90670 (213) 802-1333	5	0	5
48098	MOBIL OIL	10735 SHOEMAKER RD SANTA FE SPRINGS CA 90678 (213) 941-8751	0	5	5
72350	STOODY CO	19425 GALE AVE INDUSTRY CA ( ) 968-0717	5	0	5
82073	VAGA INDUSTRIES	2505 LOMA AVENUE SOUTH ELMONTE CA 91733 (213) 442-8631	5	0	5
645	AEROSOL SERVICES	425 SO. NINTH AVE. INDUSTRY CA 91749 (213) 969-8531	4	0	4
6325	CAL ENGINE PRODUCTS	940 S. AJAX AVE INDUSTRY CA 91748 (213) 964-6987	4	0	4
8728	CLOVER ENTERPRISE	13701 EXCELSION SANTA FE SPRINGS CA ( ) 921-3434	4	0	4
12525	EL MONTE HEAT TREATING	2456 A. N. ROSEMEAD SOUTH ELMONTE CA (213) 448-2957	4	0	4
13220	ENTENMANN ROVIN CO.	4747 CITRUS PICO RIVERA CA 90660 ( ) - 0	4	0	4
18116	FAN ENGINEERING	9743 E. ALESIA ST. SOUTH ELMONTE CA ( ) - 0	4	0	4
18500	FIBER CONTAINER CORPORATION JOE APODACA	15330 DON JULIAN RD INDUSTRY CA 91744 (213) 968-8502	0	4	4
20758	GENERAL TIRE COMPANY	18895 ARENTH AVNEUE INDUSTRY CA 91749 ( ) 964-1241	4	0	4
23500	HARRIS OLDS	13617 E. WHITTIER BLVD. WHITTIER CA ( ) - 0	4	0	4
27041	I.M.C. FREIGHT	10445 NORWALK SANTA FE SPRINGS CA ( ) - 0	0	4	4
58854	PRO-PAK	211 N.WILLOW INDUSTRY CA ( ) - 0	4	0	4
79496	VODE HOLM STEEL CO.	9331 SANTA FE SPRINGS RD. SANTA FE SPRINGS CA ( ) - 0	4	0	4
6725	CALIFORNIA CARBURETOR	16520 CORNET AVE SANTA FE SPRINGS CA ( ) 921-4325	2	0	2
7342	CARMENITA FORD	13443 EAST FREEWAY DRIVE SANTA FE SPRINGS CA 90670 (213) 921-1411	0	2	2

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12561	EL MONTE STEEL STREAT	2456 N. ROSEMEAD BLVD. SOUTH ELMONTE CA 91731 ( ) 575-1224	3	0	3
21758	GOULDS PUMPS	3951 CAPITOL AVENUE INDUSTRY CA 91749 ( ) - 0	3	0	3
24522	HONEYWELL, INC.	1200 E. SAN BERNARDINO ROAD WEST COVINA CA 91790 (213) 331-0011	3	0	3
34770	KIN-LINE, INC.	8409 CHETLE AVENUE SANTA FE SPRINGS CA 90670 ( ) 945-3684	3	0	3
40351	LABRICATING SPECIALTIES	8015 S. PARAMOUNT BLVD. PICO RIVERA CA ( ) - 0	0	3	3
44150	M & T CHEMICALS INC	7343 PARAMOUNT BLVD PICO RIVERA CA 90660 (213) 723-0991	3	0	3
58690	PREMIER METAL CO	227 N SUNSET AV INDUSTRY CA ( ) 336-4536	3	0	3
68073	SEA CHROME	9821 KLINGERMAN SOUTH ELMONTE CA 91733 ( ) - 0	3	0	3
80195	UNIVERSAL ASPHALT	10610 PAINTER SANTA FE SPRINGS CA 90670 (213) 941-0201	0	3	3
1367	AMFAC GARDEN	19362 WALNUT DRIVE ROWLAND HEIGHTS CA (213) 964-1285	2	0	2
4436	BROWN JORDEN	425 SO. TRUMMBALL CANYON ROAD INDUSTRY CA (213) 330-2236	2	0	2
6550	CAL TRANS	1940 S. WORKMAN MILL ROAD WHITTIER CA 90601 ( ) 692-0822	2	0	2
6620	CALGON CORPORATION RICHARD PILAVJIAN	14576 E. BONELLI INDUSTRY CA 91745 (213) 968-5588	2	0	2
7915	CENTURY HEEL CORP.	1708 NORTH TYLER AVENUE SOUTH ELMONTE CA 91733 (213) 283-8238	2	0	2
7960	CERRITOS COLLEGE	1110 E ALONDRA NORWALK CA 90650 (213) 860-2451	2	0	2
9140	CONSOLIDATED WESTERN CONTRACTS	727 SOUTH NINTH INDUSTRY CA 91745 (213) 968-9540	2	0	2
9265	CONTINENTAL HEAT TREATING	10643 NORWALK SANTA FE SPRINGS CA 90670 (213) 944-8808	2	0	2
12185	ENGIS MOTOR TRUCK CO.	8830 E. SLAUSON AVE. PICO RIVERA CA 90660 (213) 949-5451	2	0	2

BKK CORPORATION - LANDFILL DIVISION GENERATOR ACTIVITY SUMMARY FOR THE PERIOD 01/01/83 TO 04/30/83
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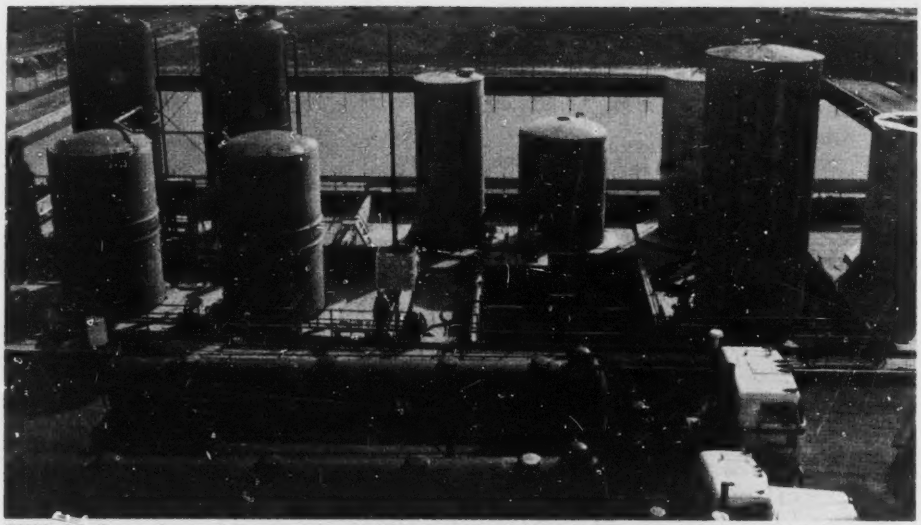
GEN NO	GENERATOR NAME	ADDRESS				TONNAGES HAZ.	TONNAGES NON-HAZ.	TONNAGES TOTAL
27025	ICP/WEST	15378 PROCTOR INDUSTRY	CA	91745	( ) 961-9581	2	0	2
34590	KERN FOODS	13000 E. TEMPLE INDUSTRY	CA	91744	( ) 962-5111	2	0	2
41479	LIBBONIA WEST	BOX 8550 INDUSTRY	CA	91748	( ) - 0	2	0	2
44298	MAGIC CHEF	245 N. VINELAND INDUSTRY	CA	91744	( ) - 0	2	0	2
49180	MUSTANG EQUIPMENT COMPANY	2425 KELLA AVENUE WHITTIER	CA	90601	( ) 699-0581	2	0	2
55621	P.H. #6	2800 WORKMAN MILL RD. WHITTIER	CA		( ) - 0	0	2	2
80110	UNITED IRON WORKS	15644 CLANTON SANTA FE SPRINGS	CA	90706	( ) - 0	2	0	2
6091	C.D.I. CORP.	19220 SAN JOSE INDUSTRY	CA	91745	( ) 965-0450	1	0	1
10799	DESIGN AND TYPE	3125 LEVEIGLEN DR. WEST COVINA	CA	91792	(714) 594-3508	1	0	1
31570	JOE'S SWEEPING	11908 E. FIRESTONE NORWALK	CA	90650	( ) - 0	1	0	1
45421	MASONITE CORPORATION	200 MASON WAY INDUSTRY	CA	91746	( ) 330-3131	1	0	1
51835	NORTHROP CORP	8930 E WASHINGTON BLVD PICO RIVERA	CA	90660	( ) 942-1513	1	0	1
57521	PELUKE PACKAGE	11605 PIKE ST. SANTA FE SPRINGS	CA		( ) - 0	1	0	1
67460	SANTA FE SPRING FIRE	11300 GREENSTONE SANTA FE SPRINGS	CA	90670	( ) 944-9713	1	0	1
71170	SPECTRO ELECTRONICS CORP.	17070 E GALE AVE INDUSTRY	CA	91745	( ) 964-6565	1	0	1
76585	TORO PACIFIC DIST.	19515 EAST WALNUT INDUSTRY	CA		( ) - 0	1	0	1
80951	U.S. POSTAL SERVICE	14730 DON JULIAN ROAD INDUSTRY	CA		( ) - 0	1	0	1
*** 197 GENERATORS REPORTED ***		REPORT GRAND TOTALS				12736	656	13392

WASTE AGE

Doorway to progress opens on waste equipment exposition

Waste Enterprises: managing ten branches

NSWMA Show Issue



BKK's San Diego chemical waste *treatment facility stores acids, alkalis and oily wastes in foreground tanks before chemical destruction and removal of toxic material is undertaken in taller reactor tanks at left rear*

From Secure Landfill to Waste Treatment

BKK Corporation, operator of the only Class I secure landfill in southern California, has developed facilities that can treat 87 percent of the area's off-site waste stream.

–BY ERNIE WINTER–

Southern California without imported water from the Colorado and Feather River projects is a desert, in many respects ideal for construction and maintenance of a secure landfill. None of the water problems that plague eastern landfills are present.

Nonetheless, officials at BKK Corporation, convinced that liquid waste treatment would be required to satisfy environmental concerns of the state, decided three years ago to develop pre-disposal treatment technology.

BKK Corporation (Torrance, California) currently manages more than 25 percent of the state of California's offsite hazardous waste stream. The new treatment system is said to be capable of processing 87 percent of the waste stream in southern California that utilizes off-site disposal.

A full-scale field model representing one module of a two-module system was tested under a state of California permit for six months last year at BKK's hazardous waste landfill site in West Covina.

The system removes 60 percent of the water from industrial wastes and renders it sewerable under state, municipal and federal regulations. The inorganic solids are chemically treated to give them a doughy consistency. Since the solids are no longer water soluable, they are safe for land disposal.

The solid residues represent less than 30 percent of the original liquid waste volume. They are currently being studied for economic recovery of a portion of their metal content.

After completion of the testing program in Los Angeles County, the single module system was shipped to San Diego County. There it was interfaced with a small tank farm and chemical mixing system at Chula Vista, near the international border with Mexico.

The site is separated from future residents by a San Diego County solid waste sanitary landfill. At time of writing the facility has been operating for two months serving San Diego County's growing semiconductor industry.

BKK has nearly completed the siting and permitting process for construction of its full-scale 300 gallon-per-minute industrial wastewater treatment plant in the Los Angeles-Long Beach Harbor area. The facility site is in the geographic center of 80 percent of southern California's industrial liquid waste production.

This project is sited adjacent to the firm's 1850 ton-per-day solid waste transfer station, and it has the endorsed support of Los Angeles Mayor Tom Bradley and numerous other local, state, and federal officials.

The Los Angeles Harbor treatment facility, scheduled for opening early in 1984, will combine its capabilities with the San Diego treatment facility in reducing the need for hazardous waste land disposal facilities within the southern California area. The two treatment facil

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Ernie Winter is corporate secretary and a member of the board of directors of BKK Corporation, Torrance, California ties will reduce liquid hazardous waste disposal at BKK's West Covina landfill site by 70 percent of current volume.

Industrial waste disposal background

In December 1968, five years after opening its 600 acre landfill in the San Gabriel Valley in northeastern Los Angeles County, BKK completed its intensive geological and hydrological investigation of the site, assuring that it was secure for the disposal of industrial liquid wastes.

Thus, BKK became the third operator of a state-approved Class I disposal site for the management of Los Angeles County's approximately 600,000 tons per year of industrial liquid wastes destined for off-site disposal. The other two, operated by the Los Angeles County Sanitation Districts, were located at Palos Verdes in the southerly part of the county and Calabasas in the northwesterly part of the county.

> **"Virtually overnight BKK became the only secure Class I landfill in the area from Tijuana, Mexico to Santa Barbara, California."**

Initially no one within BKK or in the community foresaw the importance that the BKK landfill would one day assume. In 1979 the County Sanitation District closed its Calabasas site because it failed to meet rigid geological requirements. In 1980 the District closed its Palos Verdes site because it had achieved its maximum capacity.

Virtually overnight BKK became the only secure, tested-safe, Class I landfill in the huge area that stretched from Tijuana, Mexico to Santa Barbara, California. The firm, by attrition, had become the only landfill available to serve the area's nearly 6,000 industries.

Regional service from parochial base

When BKK opened its landfill in West Covina in 1963 it was "the only kid on the block," and the entire site was peripherally surrounded by fallow open space. Because of the shortage of subdividable single and multi-family residential property, the West Covina City Council in the mid-1970's yielded to the recommendation of its planning department and permitted the development of residential subdivisions on the outer slopes of the BKK site.

By the winter of 1980, Californians' fears of so-called hazardous wastes—all of which they perceived to be "toxic"—had reached near hysteria due to exposure to media coverage of Love Canal and the discovery of abandoned illegal chemical disposal sites in California.

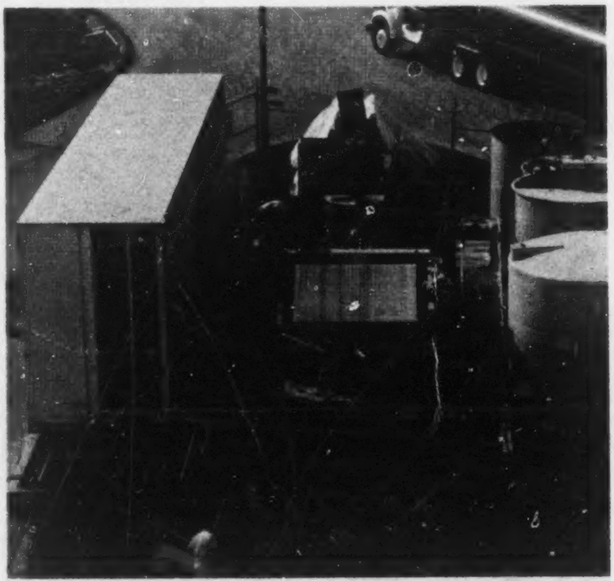
At that time seven licensed, state approved hazardous waste disposal facilities still existed in California, but the public pressures for their closure were tremendous. Recognizing that the remaining sites had to be preserved to allow time for development of new technology which de-emphasized landfilling of untreated wastes, the California legislature "took the bull by the horns" in a Senate Bill sponsored by 7th District State Senator Daniel Boatwright. The Bill preempted local government from causing the political closure of any of California's remaining sites.

Senator Boatwright's bill, known as Senate Bill 501, was approved unanimously by both the Senate and California Assembly. It was signed by Governor Jerry Brown on July 21, 1981. This legislation reserved the right to close hazardous waste disposal sites to the Director of Health Services of the state of California and only upon a finding that a specific site poses imminent health hazards to the surrounding community.

Residents attack politically

Ironically, as the importance of BKK's West Covina site increased to the nearly 6,000 industrial employers, so did the attacks on its existence by the relatively recent arrivals in the city, BKK's new neighbors. Though they had been required by the city to sign formal statements prior to purchasing their homes recognizing the proximity of the landfill, the new homeowners in a series of initiative petitions (which are permitted under California's election laws) caused the following to appear on the ballot in West Covina.

a. A proposition that hazardous wastes no longer be permitted to be disposed of within the city of West Covina.



***Chemical feed system utilizing** a belt filter press remove non-leaching solids from hazardous wastes. The electro-flotation unit in trailer at left removes final residuals of toxic materials from waste waters.*

b. The recalling from public office of four of the incumbent City Councilmen.

When all of the ballots were counted on election night, both propositions had failed and subsequently the incumbent councilmen were re-elected.

City tries the courts

The ink on Senate Bill 501 was barely dry when the city of West Covina, yielding to pressures from its new residents in subdivisions adjacent to the landfill, appealed to the Superior Court of the State of California for relief from the legislation.

On January 22, 1982, a judgment was filed with the clerk of the Superior Court which found:

"That regulation of the field of disposal, treatment, and recovery of resources from hazardous wastes, or a mix of hazardous and solid wastes, at all existing Class I disposal facilities is a field that has been preempted by state law."

The court further ruled: "That by preempting the field as described above, the state of California has precluded the city from enacting, issuing, modifying or enforcing any ordinance so as to prohibit the disposal, treatment, or recovery of resources from hazardous wastes, or a mix of hazardous and solid wastes, at the BKK facility in West Covina, unless after public notice and hearing the Director of the State Department of Health Services determines that the operation of the BKK facility may present an imminent and substantial endangerment to health and the environment."

BKK Waste Service Facilities

BKK Class I Sanitary Landfill, West Covina, California receives between 8,000 and 10,000 tons of hazardous wastes per day.

Solid Waste Transfer Station at Los Angeles/Long Beach Harbor on a five acre site, handles 1,500 tons per day.

Aptec-I Liquid Waste Treatment Facility, in permitting stage, to be located in Los Angeles/Long Beach Harbor area, processing 270,000 gallons per day of industrial liquid wastes.

San Diego Liquid Waste Treatment Facility, Chula Vista has treatment capacity of 90,000 gallons per day.

PCB Storage Facility at Beatty, Nevada, houses from 1,000 to 1,500 drums in transit to incineration.

Falcon Disposal Co. at Wilmington, California operates twelve roll-off trucks in commercial refuse service.

El Segundo Disposal Co. at El Segundo provides residential and commercial collections with ten truck fleet.

Chancellor and Ogden, Long Beach, operates thirty-five vacuum trucks in industrial vacuum collection service.

Entering the second quarter of 1983 and a new high technology era of waste disposal, BKK Corporation's board of directors, chaired by Ben K. Kazarian, Jr., has grown to nine members including four grandsons of the founder, Ben, Sr.: Ken, Dan, Kris, and Don Kazarian.

For BKK, the future game plan will probably continue to emphasize the same strengths that brought their current success. **WA**

BKK CORPORATION BKK 2550 237TH STREET • P.O. BOX 3038 • TORRANCE, CALIFORNIA 90510
(213) 539-7150

NOTICE

NEW HAZARDOUS WASTE RULES ARE NOW IN EFFECT!

Avoid police tickets for yourself and heavy fines for your company.

THE WEST COVINA POLICE DEPARTMENT AND OTHER LAW ENFORCEMENT AGENCIES HAVE ANNOUNCED NEW MEASURES TO STOP SPILLS. BE SURE YOU KNOW YOUR RESPONSIBILITIES.

Save drivers and companies from severe fines and big cleanup costs by following these simple rules

1. Make sure your manifest is correct and all overflow valves are closed and capped before you leave plant.
2. In West Covina and approaches, stay in right lane and do not exceed 25 m.p.h.
3. Keep your rig clean and in good condition.

Faulty equipment and poor maintenance lead to spills and accidents.

4. Have your manifest ready for inspection by appropriate authorities.
5. Drive slowly and smoothly. Sudden stops and starts cause spills. Cleanup costs to your company can run into thousands of dollars even for the mildest substances. Fines could add to the cost.
6. Keep informed. For answers to questions, call:

State Health Dept.	213-620-2380
Sheriff's Dept.	213-330-3322
Highway Patrol	213-338-1164

- Driver errors and faulty equipment have been cited as responsible for most hazardous waste spills. Don't let it happen to you.
- Report faulty equipment at once to your supervisor or mechanic.
- Do not take faulty equipment out on road.
- Observe speed and lane laws.
- Check your rig before and after every load.
- Complete and update your driver training.

This notice printed by BKK Corp. in cooperation with:

- **West Covina Police Department**
- **California Highway Patrol**
- **State Health Deptartment**

NOTICE ISSUED TO

DRIVER: ____________________

COMPANY: ____________________

TRUCK I.D.: ____________________

SUPERVISOR'S NAME: ____________________

NOTICE WRITTEN BY: ____________________

DATE: ____________________ TIME: ____________________

____
DRIVER'S SIGNATURE

STATE OF CALIFORNIA
GEORGE DEUKMEJIAN, Governor
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
LOS ANGELES REGION
107 SOUTH BROADWAY, SUITE 4027
LOS ANGELES, CALIFORNIA 90012-4596
(213) 620-4460

May 25, 1983

City of La Puente
15900 Main Street
La Puente, CA 91744

Attn: Gordon L. Oehl
City Manager

Gentlemen:

This is in response to your letter dated April 28, 1983, regarding storm runoff from the BKK landfill in West Covina to the Puente Creek drainage system.

We have investigated this flow over the past rainy season and have required BKK to conduct a sampling program. The results show the water to be normal surface runoff that is not influenced in any way by the landfill contents nor has it come in contact with them.

This storm flow is normally captured and held for use (e.g., dust control) at the landfill, but this year there has been just too much rain to hold all of it.

Thank you for your interest in this matter. Please be assured we will continue to keep a close surveillance on the landfill. As you requested, we have added your City to the mailing list for this case.

Very truly yours,

Raymond M. Hertel
RAYMOND M. HERTEL
Executive Officer

cc: Los Angeles County Flood Control District
City of West Covina, Attn: Mike Miller
BKK Company, Attn: Ernie Winter

Editorial KGTV10 SAN DIEGO

WASTE TREATMENT PLANT

How to dispose of hazardous wastes. It is a question of long-standing concern, nationwide.

Built by the B.K.K. Corporation without public funds, the plant will recover recycled oil and valuable metals while disposing of hazardous waste materials. They call it a prototype for the future.

It sounds too good to be true but we view it as the first positive step toward changing an attitude.

For too long, we've dumped our garbage into landfills, only to have them covered over, sold and recycled as expensive real estate. We have only to look at the homes lost when a hillside gives way or remember the Love Canal incident. The effects of that fiasco have yet to be determined.

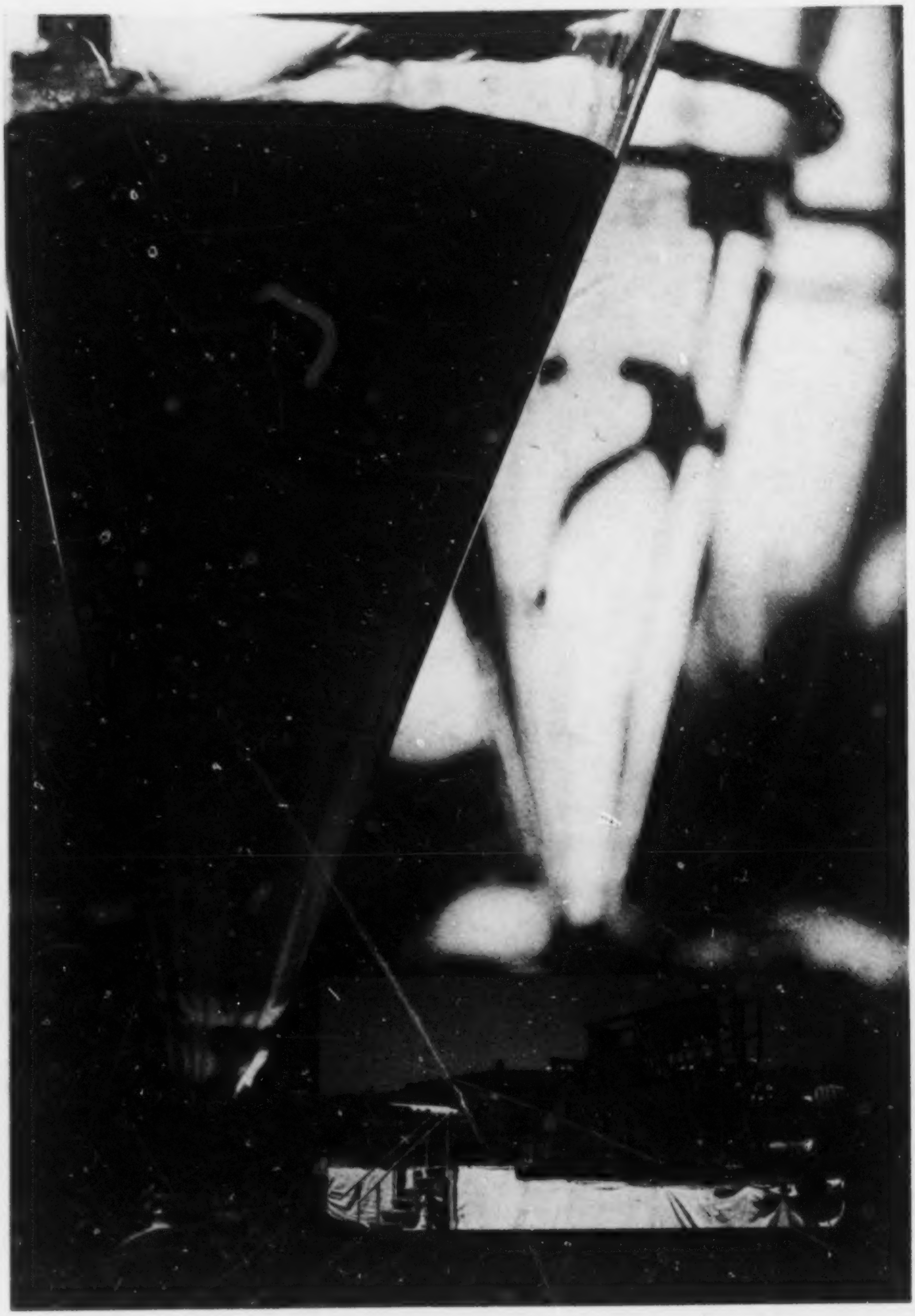
B.K.K. appears to have accomplished what bureaucrats would not. This type of plant is long overdue.

We enthusiastically applaud their initiative and urge our legislators to take a clue from this company with an innovative, inexpensive idea.

AIRED BY MCGRAW-HILL VICE PRESIDENT AND GENERAL MANAGER CLAYTON H. BRACE
FOLLOWING 11:30 A.M., 5 & 11 P.M. NEWSCASTS, WEDNESDAY, JUNE 1, 1983

KGTV10 regularly presents Editorials on topics of vital interest to our community. Responsible spokespeople with opposing viewpoints will be given time to reply. If you missed this Editorial on our air, we hope you take time to read it. Your comments are always welcome. Editorial Producer.

Appropriate Technologies:
Dawn of a New Age
in waste management.



Dawn of a New Age.

A PROFILE OF BKK CORPORATION'S APPROPRIATE TECHNOLOGIES WASTEWATER TREATMENT PROJECTS.

AS THE IMPACT of modern civilization becomes apparent in the farthest corners of the Earth — and the issues of environmental protection, management of our natural resources, and the quality of life become more and more critical — there is a growing need for careful handling of wastes.

The days of simply burying untreated wastes are gone. We can no longer afford to devote large acreages adjacent to population centers for landfills and "dump" sites. The socio/political problems inherent in new siting of safe and practical disposal facilities have become nearly insurmountable. Techniques once considered to be minimally beneficial are being reevaluated by science, industry and government. With many of our natural resources in short supply, recycling and reclaiming materials once considered worthless is becoming increasingly attractive.

In short, we are entering a new era of waste management; the treatment, reduction, and recycling of wastes will be vital for a prosperous, healthy, and happy life for generations to come.

For more than five decades, BKK Corporation has been leading the way to innovative systems of waste management, oftentimes initiating techniques long before they became politically and economically "convenient". In that tradition, BKK has embarked on a development program for a series of liquid waste treatment centers at several locations in the Western United States — fittingly named Appropriate Technologies — to provide the most efficient means of waste management possible.

WATER, SO IMPERATIVE to man's survival, is the factor which gives mobility to hazardous waste. It allows unwanted and often dangerous chemicals, metals and other materials to flow into places they simply aren't wanted. The Appropriate Technologies facilities are capable of treating and substantially reducing the volume of liquid industrial wastes to yield water of acceptable quality for disposal into a sanitary sewer and a sludge cake for landfill disposal.

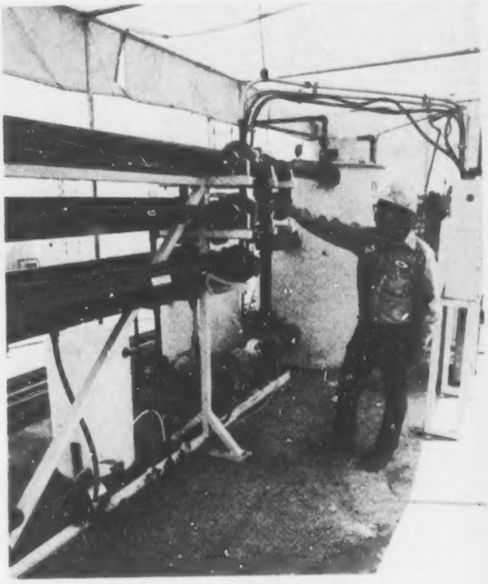
Initially, these plants have been designed to process 1400 tons per day of combined hazardous waste, operating two shifts over a five day work week. With the addition of a third shift over seven days, these facilities can double their output.

Although the waste filter cake is no longer water-soluble after treatment, and thereafter, safe to handle, it is BKK's intent to recycle a portion of this by-product because of its high metal content.

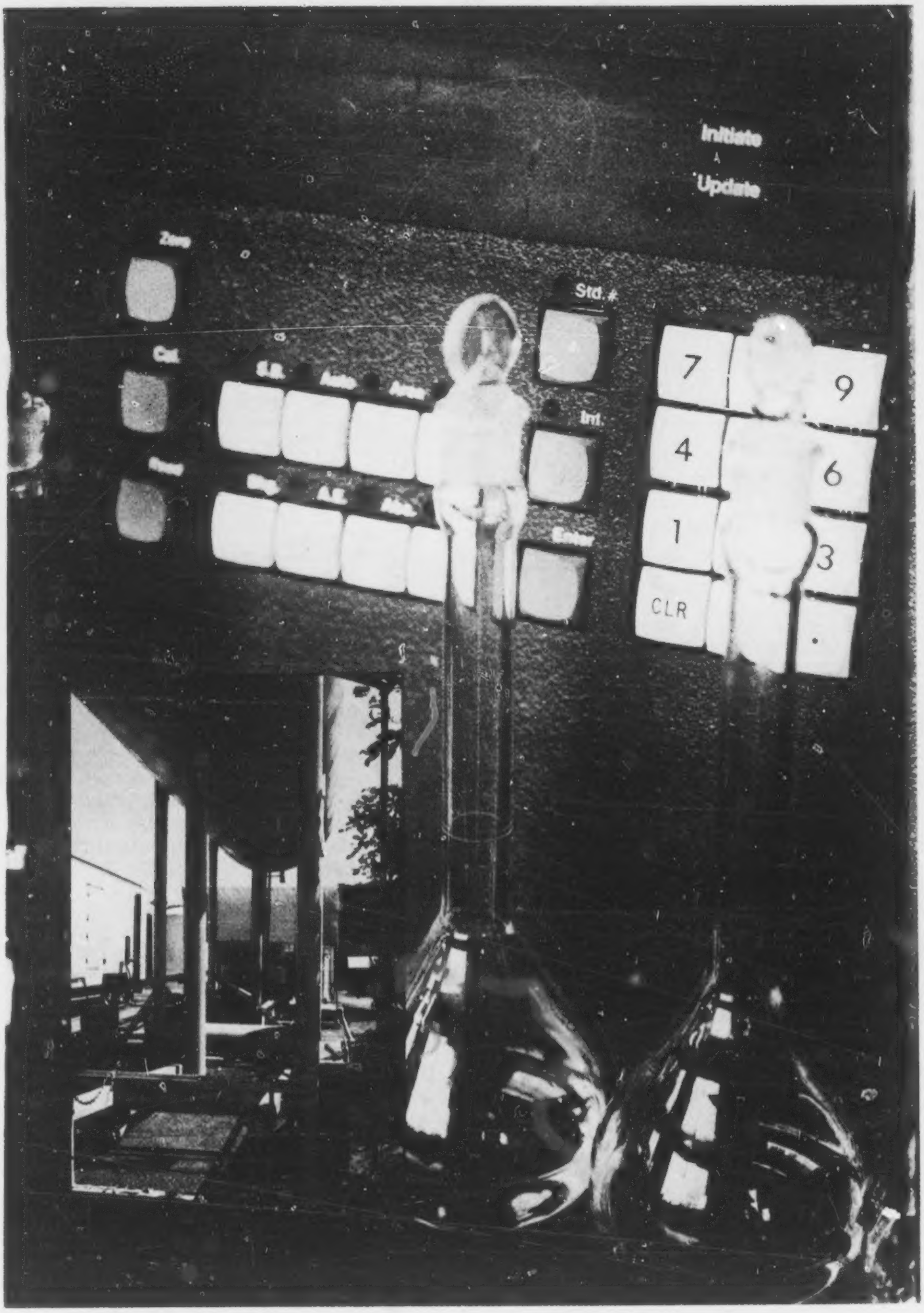
The waste material is viewed as a new source for recapturing large quantities of copper, nickel, lead, chrome and other strategic metals at a lower cost than mining and refining new metals. This added "bonus" provides additional practical and economical incentives for the treatment and reduction of the wastes.

The state-of-the-art treatment process employed in the APTEC projects involves highly sophisticated technology and equipment. Each batch of wastewater is measured and tested throughout the treatment process, providing the information necessary to determine the proper handling of that particular chemical composition, whether it be of alkali, oily, or acidic content.

The wastewater is subjected to a series of treatments aimed at neutralizing and reducing the volume of liquid. These processes include settling, separating, skimming, screening and conditioning until the bulk of the wastewater is sewerable. The residual waste filter cake has the consistency of modeling clay and will require secure land disposal.



Quantities of copper, nickel, lead and other metals, which are found in large percentages in the wastes, are measured by APTEC technicians (above and right). The recycling of these metals is becoming increasingly attractive from a practical and economic standpoint.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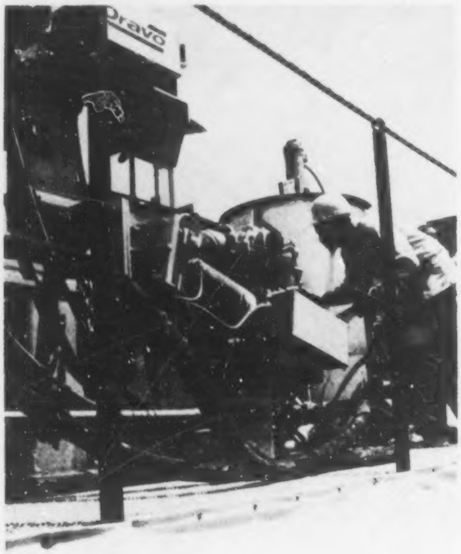
Each batch of waste water is carefully evaluated to determine the proper treatment necessary (above). Solid wastes are dewatered by giant belt filter presses (below), substantially reducing the volume of liquid waste



WHEN BKK CORPORATION entered the waste management field in Southern California over a half-century ago, rubbish was being burned in backyard incinerators and public dumps. Industrial liquid wastes were flowing to sea via municipal and county sewer systems.

Subsequently, in the late forties trash burning was prohibited by the newly created Air Pollution Control District and BKK developed the cut-and-cover method of trash disposal. The word "Dump" was discarded for the term "Sanitary Landfill."

As early as 1963, under contract with a West German engineering firm, BKK designed a complete solid and liquid waste co-generation plant but was unable to capitalize the project because of the cheaper alternative, $1.50 per ton landfill disposal and the low cost per-barrel of crude oil. Southern California simply was not ready for high-technology waste management in 1963.

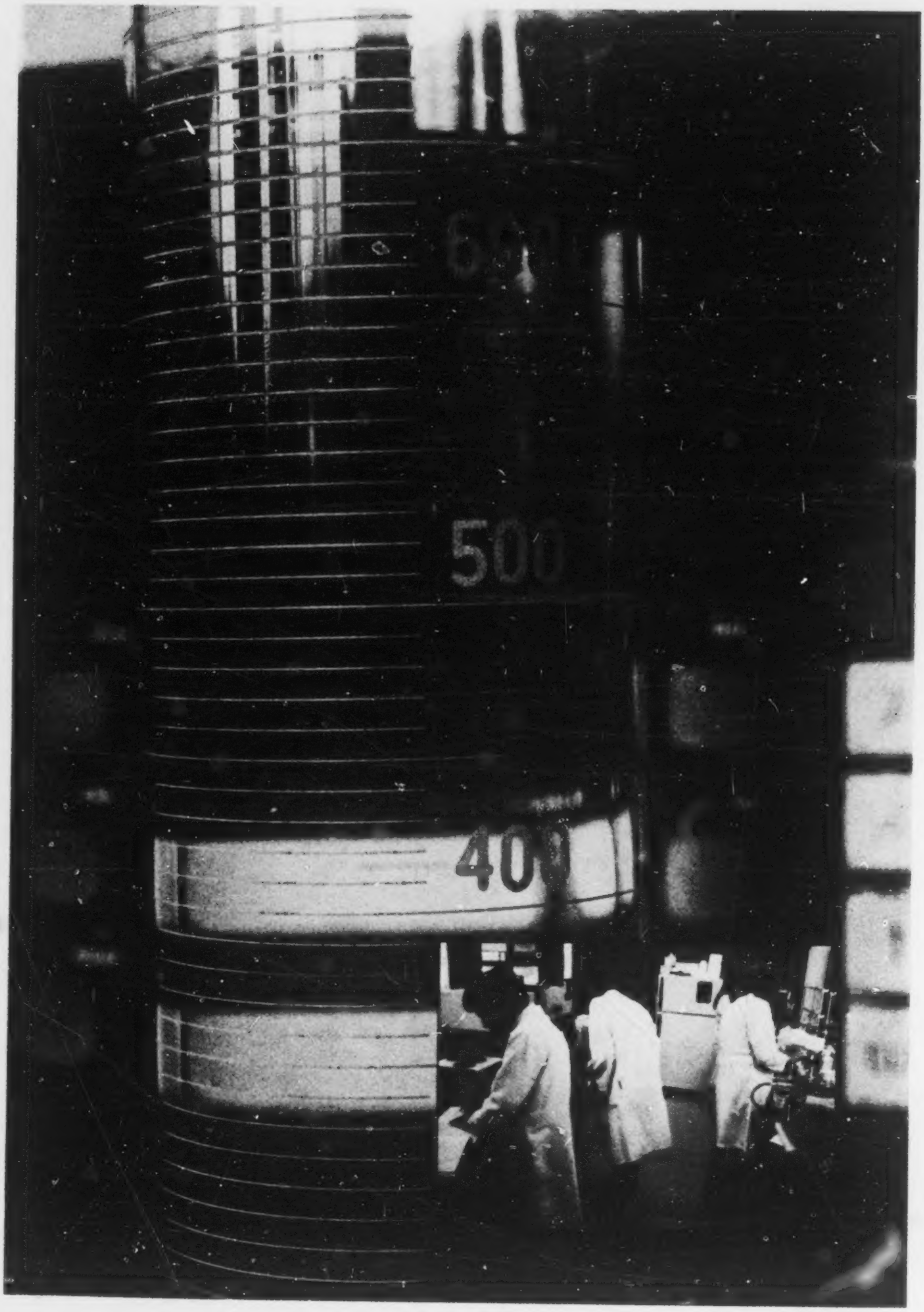
In 1968, when heavy metals were discovered in fish caught in coastal waters, a Federal Regulation was issued prohibiting the ocean discharge of industrial liquid wastes, leaving two alternatives for safe hazardous waste management, namely burning or landfill. However, burning was unacceptable due to already polluted ambient air in the Los Angeles basin.

In December 1968, State and local agencies, after thorough geological testing of the site, prescribed operating conditions for the company's 600-acre Class I disposal site in West Covina for the landfilling of hazardous industrial wastes.

During the past 12 years, as government and industry learned more about the industrial waste problem, numerous changes in the state-of-the-art were prescribed by the regulatory agencies which control the landfill.

BKK, in the near future, will be unveiling a thermal destruction system to reduce the remaining 30 percent which contains the more hazardous volatile organic wastes.

The application of technology demonstrated in BKK's APTEC projects will have a marked effect on waste management policies in the Western U.S. In California alone, for example, it will no longer be necessary to landfill untreated inorganic industrial wastes, which comprise an estimated 70 percent of non-sewerable industrial liquid waste stream.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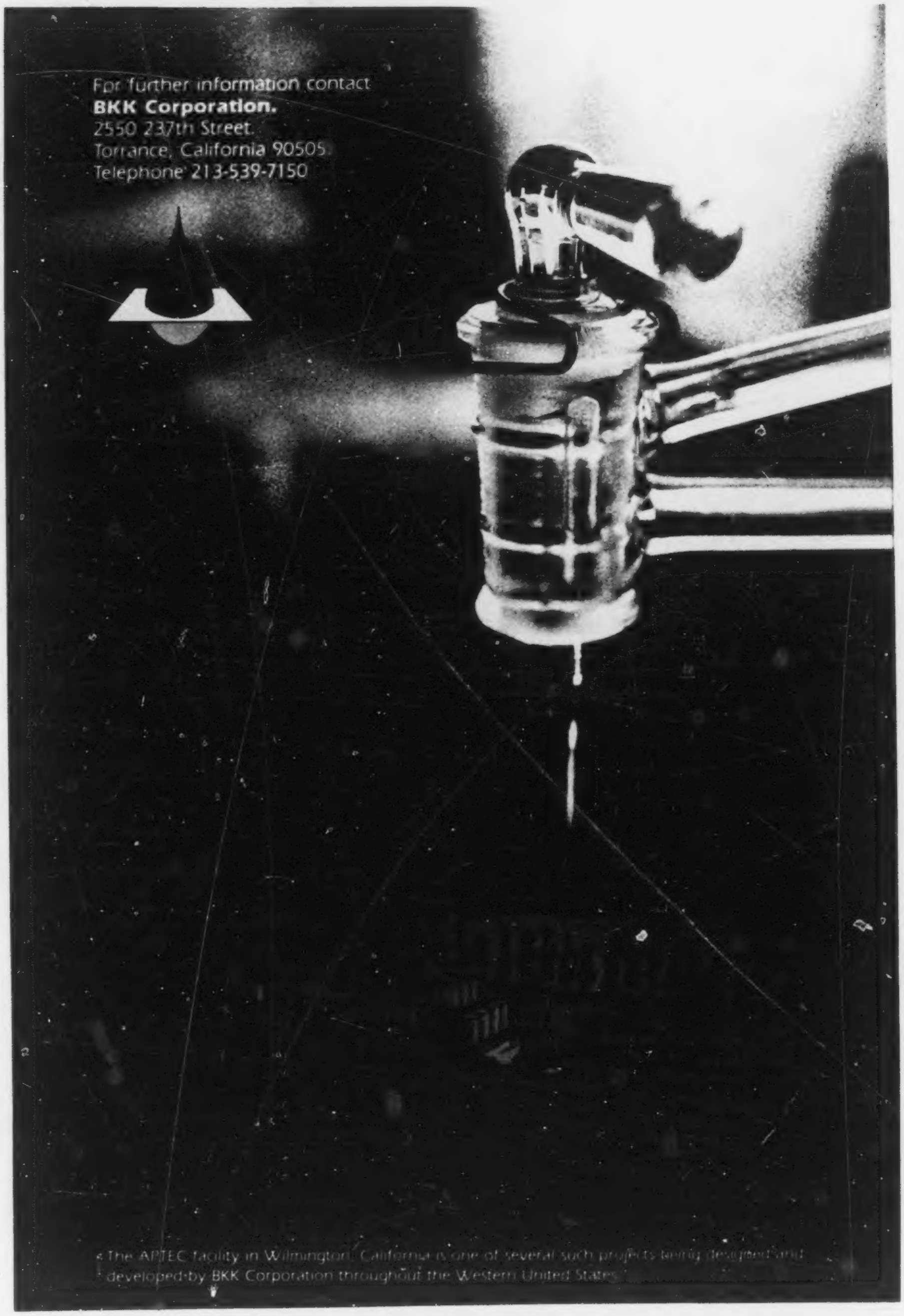

For further information contact
BKK Corporation.
2550 237th Street.
Torrance, California 90505.
Telephone 213-539-7150

The APTEC facility in Wilmington, California is one of several such projects being designed and developed by BKK Corporation throughout the Western United States.

TESTIMONY OF THE BKK CORPORATION ON ALTERNATIVE TECHNOLOGIES FOR THE TREATMENT AND DISPOSAL OF HAZARDOUS WASTES

The occasion of this testimony is a joint Congressional and California State Assembly committee inquiry into the progress of state and federal efforts to complete federally mandated clean-up of designated abandoned hazardous waste sites. The Stringfellow site is an appropriate case study, and we are pleased to offer our comments on the treatment and disposal alternatives.

The BKK Corporation operates solid waste and hazardous waste disposal facilities in several locations in Southern California. We have been in business for many years and have experienced transitions in technology ranging from backyard incineration of solid household wastes that was at one time common in the Los Angeles area, to modern state-of-the-art hazardous waste treatment facilities, such as the one we have just completed in San Diego County.

Based on our experience, I can say without qualification that the sophistication and type of disposal that is utilized by private industry is purely a function of government regulation, including the indirect effect of competition from government operated disposal facilities.

Using the Stringfellow site as a case study, the evidence is clear that the type of waste disposal used at Stringfellow, i.e., surface impondment/evaporation pond was dictated by the prevailing regulatory

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Testimony by Kenneth B. Kazarian, Vice-President, BKK Corporation, April 22, 1983 at the Jurupa Junior High School, 8700 Galena, Glen Avon, California. Testimony was delivered to a joint hearing by the Sub-committee on Natural Resources, Agricultural Research and Environment of the House Committee on Science and Technology and the California State Assembly Committee on Consumer Protection & Toxic Materials.

climate. There were no regulatory restrictions on toxic air emissions, and land disposal was believed to be the most cost-effective means of disposing of hazardous waste in the region. In retrospect, we now know that evaporation ponds may emit high levels of toxic air emissions and that the long term costs of land disposal may be considerably higher if facilities are not properly maintained. Also in retrospect, we now know that if alternative treatment technologies had been employed to neutralize, dewater, and otherwise detoxify the wastes placed in the Stringfellow ponds we would not be in the unfortunate situation we face today.

The reason that Stringfellow type wastes were not treated then, and why similar wastes are continuing to go untreated into evaporation ponds and landfills today, is that treatment is more expensive. The same regulatory disincentives for treatment of hazardous waste before they are placed in ponds, landfarms, and landfills that existed when the Stringfellow site was operating, also exist today. All that we can say for ourselves as a society is that proposed RCRA standards would require that these land disposal facilities be better engineered. Yet even these standards presuppose that land disposal facilities would pose a risk to underlying groundwater.

As the operator of a Class I hazardous waste landfill that underwent rigorous scrutiny for many years before hazardous wastes were allowed to be disposed there, we believe that in instances where there is no underlying groundwater, untreated liquid hazardous waste can be safely disposed of in land disposal facilities. However, these sites are few and far between and there are many that believe that another landfill or evaporation pond facility capable of accepting Class I materials cannot be sited anywhere in the state, because of widespread public opposition; largely due to experiences such as Stringfellow. In addition, off-site land disposal facilities account for only a small fraction of the hazardous waste disposed of in the state. Adding more off-site evaporation ponds and landfills will hardly begin to address the need since the vast majority of hazardous wastes generated in this state are disposed of either in municipal sewers or in on-site landfarms and evaporation ponds.

To avoid future "Stringfellows" and to assist in cleaning up the Stringfellow site, alternative treatment technologies can be employed. We do not recommend any specific technology, but can assure you that proven economical technologies do exist for a wide spectrum of waste products commonly encountered in the state. For example, with our treatment equipment we have demonstrated an ability to effectively treat Stringfellow leachate, and in fact, have made a proposal to the State to treat the leachate under an existing contract in lieu of transporting the waste to our Class I landfill. We have also constructed and are now operating a hazardous waste treatment facility in San Diego County that is capable of treating most of the types of waste that were originally placed in the Stringfellow site. We believe we will be able to compete with existing cheaper landfill and evaporation pond facilities because those facilities are located a great distance from San Diego County and higher transportation costs generally offset higher treatment costs.

Rather than detailing how our treatment processes work we will simply extend an invitation to the committee members to inspect our facilities. We would only emphasize again that in our view, the Stringfellow issue is not a technical issue. The technology exists to evaluate the problem, assess the environmental risks, and effectate a clean-up plan. The issue is economics. In this case the less expensive clean-up options may be treatment of wastes on-site rather than excavation and removal to a landfill, unless of course incineration of all solids is considered.

If you have any questions about particular treatment technologies I would be pleased to answer them at this time.

References

1. Technologies and Management Strategies for Hazardous Waste Control; (1983). Congress of the United States, Office of Technology Assessment, Library of Congress Catalog No. 83-600706.
2. Alternatives to the Land Disposal of Hazardous Wastes, An Assessment for California; (1981). Toxic Waste Assessment Group, Governor's Office of Appropriate Technology, State of California.

Mr. **Kazarian**. Thank you, Mr. Chairman.

In relation to the operation of our BKK landfill and small business, the focus has been put upon the small businesses here in the area and we will want to address that subject a little later in our talk, but we think that it is also important for the committee to understand that just within the 34th Congressional District a study was done very quickly, which showed over 200 small businesses, generating hazardous waste in the 34th Congressional District, which in the year 1983 it is projected that approximately 40,000 tons of these hazardous wastes will be generated. We feel that it is very important to note that many small businesses are dependent on economical, close hazardous waste disposal for their existence.

We have been looking at ways of servicing small business in other ways, for transportation and for treatment, which we will also be addressing, but at this point we would like to express that there is a need for hazard waste disposal for small businesses.

In response to the spill issue, which has been spoken about, on Azusa Avenue. Many of the problems which we have seen which have affected the small businesses and the residents here have been a cause for concern, simply because there has been a long lag-time in quick, available response as far as identification of the spills and cleanup. Azusa Avenue happens to be a street that has many overlapping functions as far as jurisdictions are concerned and it has been very difficult many times just to coordinate those actions.

In response to this, BKK has gotten together with all the responsible agencies. We have purchased and built a response vehicle and are going to be very shortly here entering into the regulatory cycle with all the jurisdictions to provide quick response for available cleanup and identification of these materials. Hopefully, this will result in very minor closures of the streets and cut down the time that the streets are closed, and people are moved away from the businesses.

Mention has been made about the gas collection system and the commingling and we would like to comment on that. The commingling system which is used by BKK Corp. for hazardous waste disposal is one which for years has been the prime method of hazardous waste disposal in southern California. It is currently practiced by the Los Angeles County Sanitation District for nonhazardous liquid waste, but in southern California we are the only class I landfill, so consequently we are the only landfill using this method.

We found over the years that it is a very efficient method for disposing of these materials for a variety of reasons. The No. 1 reason is it enables us to collect any fugitive emissions from the disposal practices associated with hazardous waste. The gas collection system is not possible in the other common hazardous waste land disposal systems, such as ponding, where the materials are purposely exposed to the atmosphere so that way the Sun will evaporate them or land farming, where they are mingled in the soil in very small quantities in the subsurface of the soil or landfilling, which is the other method, just mixing it with dirt. These methods do not operate in a manner which would allow you to collect these gases. So, therefore, we feel that the method here is a much better method. In cooperation with all the agencies in the past months, we have designed a system, which we feel, when the other systems which are used for land disposal undergo the same amount of scrutiny as our system has, our system will be looked upon as a model for the industry.

On the issue of treatment, there has been some discussion this morning. We feel this is a very important subject to discuss and where we are going in the future. Currently, the State of California has a program which is going to be mandating the treatment of certain waste before landfilling.

Some of the comments made just earlier are very critical to the overall situation and why are we going to treatment and how do we get to treatment and what will treatment give us. BKK Corp. currently is operating a treatment facility in San Diego County providing disposal services for the local industries in that area. Prior to this, their only alternative was to truck the materials some 5 and 6 hours to our facility here in West Covina.

With the operation, however, of our facility down there, we are now able to provide treatment and disposal to these facilities for about 90 percent of all the materials generated in San Diego and the volume reduction resulting from those actions in the treatment facility is resulting in a volume reduction of 60 to 70 percent. We feel that these are going to be the trends of the future, but there are many hurdles to get over before we see all hazardous waste going to treatment facilities.

With that, I would like to turn it over for questions.

Mr. **Skelton**. Mr. Johnson, Mr. Vogel, Mr. Gastelum, do you have any comments?

Before I call on my colleague, Mr. Kazarian, I wish to thank you on behalf of the committee and our staff for meeting us early this morning and giving us a tour of the facility so we can more adequately ask questions. We appreciate your doing that and also your frankness in answering questions that we put to you at the time.

Mr. **Kazarian**. You are welcome, sir. We appreciate the opportunity to discuss the situation. We feel that when people get a better understanding of how we operate and how we function within the system, a better understanding for where we are going to go in the future will be had by all.

Mr. **Skelton**. Congressman Torres.

Mr. **Torres**. Thank you, Mr. Chairman.

I, too, would like to acknowledge the chairman's gratitude in giving us the opportunity to survey the landfill. It was an interesting tour. I have also previously toured the landfills. I am also familiar with your San Diego facility and I think I would like to perhaps direct one of my questions about that facility.

Would you elaborate on exactly the record—how that treatment facility works? I understand it neutralizes the water in liquids, so that you end up, I guess, with a sludge.

Mr. **Kazarian**. Yes. To simplify the situation, the facility is designed primarily to handle the inorganic waste stream, which by and large is a larger volume of wastes here that can't adequately be treated with off-the-shelf hardware today. In that area we see a lot of electronic waste, electroplating waste coming out of the electronics manufacturing industries. Simply put, we take acidic or caustic solutions and neutralize them. Those materials are generally contaminated with heavy metals.

In that process, heavy metals are precipitated out and using mechanical devices and chemical treatment, we draw the water off, take the contaminants which were in that solution originally—I don't want to give you percentages—the single largest constituent in liquid hazardous waste is water and it is water solutions which are contaminated with a variety of contaminants.

In the case of the inorganic waste stream, most of the time it is heavy metals. We drive the water off and the remaining contaminants, which contaminate that solution, are encapsulated in a filter cake. That filter cake will represent, depending upon the material, anywhere from only 10 percent to sometimes as high as 30 percent of the original volume.

It is nonmobile. It is nonreactive. It is neutral. You can pick it up, hold it in your hand and the only way it could ever be considered hazardous would be if someone purposely ingested it. That is the only material that goes to the landfill. The waters that are cleaned up are cleaned up to where they meet local sewer discharge standards.

Now, we have designed systems that we can meet Federal drinking water standards in cleaning these materials up, but the expense and to justify for a relatively small number of users to put in that extra equipment to clean it up to that point is not necessary. We clean it up to meet the local sewer discharge requirements and let those facilities, which the public has spent millions of dollars on, clean the remaining contaminants up.

Mr. TORRES. Is that water actually neutralized from acids and put into the sewer system? Who monitors the procedure?

Mr. KAZARIAN. In our San Diego facility they go into two large concrete holding tanks where the water can be evaporated. When it is deemed necessary that we discharge the water to the sewer, a sample is taken to an independent laboratory, where it is then certified as meeting sewer discharge requirements.

Once that pond has been certified nothing else goes into it until it has been emptied. We have been given a set of restrictions and we operate within those parameters. It is to our best interest to keep the facility operating within those parameters because the larger volume reduction we get, the more water we can drive off, the facility operates on a more efficient basis.

Mr. TORRES. Then your resultant residue or sludge, if you will, is that brought here to the BKK landfill?

Mr. KAZARIAN. Currently it is being disposed of here in the landfill. Several options which we are looking at in the future is a recycling of the heavy metals out of that filter cake. We have done some testing which has been extremely positive for our chemists and our technicians. We have drawn out chrome. We have drawn out copper, zinc, other heavy metals. We feel that in the future this sludge cake is going to be a vehicle which will allow us to recover materials, which up to this point in time have not been recyclable.

Mr. TORRES. Are you burying the sludge now?

Mr. KAZARIAN. Yes, it is disposed of here in the landfill.

Mr. **Torres**. What happens when it rains and there is seepage? Wouldn't the water dissolve that sludge back to the original liquid state?

Mr. **Kazarian**. No. They have been chemically altered. Now, I am not a chemical technician. We can get some more information on that for the committee if it is deemed necessary, but it is not instant hazardous waste, just add water. It has been chemically altered and it is encapsulated in a nonmobile state. It is basically nonwater soluble.

Living in a landfill environment, such as the West Covina site here, these materials will not move at all. The prime problem with all hazardous constituents and contamination problems has been mobility and by removing the water and tying them up in this filter cake, we take the mobility away from it.

Mr. **Torres**. Are you saying in effect that the process that you are now undertaking at your San Diego facility is, for sake of a better word, the state of the art?

Mr. **Kazarian**. We feel very confident in saying that this facility is probably the most advanced facility in the State of California. It was patterned after the California ban on certain hazardous wastes and designed to perform the functions which are going to be mandated by that ban.

Mr. **Torres**. Thank you. I have no further questions, Mr. Chairman.

Mr. **Skelton**. Mr. Kazarian, let me ask you, how often is there a spillage that causes closure of Azusa Avenue?

Mr. **Kazarian**. Our records indicated that from the period of July 15, 1981, to the present, there have been 14 spills on Azusa Avenue that have caused a closure. These numbers, I believe, are——

Mr. **Skelton**. Where they had to call in the whole rigamarole as we went through awhile ago, is that right?

Mr. **Kazarian**. I assume that these were spills which were considered to be hazardous materials which took some regulatory action to clean them up.

Mr. **Skelton**. Are there other type spills that would be less serious in nature or not as time consuming that you know about?

Mr. **Kazarian**. Other than just maybe papers on the streets. We have a crew that goes out and polices the area immediately in front of the landfill and things like that.

Mr. **Skelton**. How often would that occur?

Mr. **Kazarian**. We have people out there doing that just on a daily basis as a regular practice in the landfill.

Mr. **Skelton**. Have you received complaints from the various businesses, either directly or indirectly, as a result of the closures on Azusa Avenue?

Mr. **Kazarian**. To my knowledge we have received no formal complaints or formal requests for any action.

Mr. **Skelton**. Have they complained to you that they had to either close their business or they were not able to perform business during any period of time?

Mr. **Kazarian**. To myself, I have not had any contact with any of those people. I am sure that these people did have some inconvenience.

Mr. SKELTON. Mr. Gastelum, do you have an answer to that?

Mr. GASTELUM. Yes, Mr. Chairman. Recently we received a letter from the mayor pro tem of the city of West Covina. I think he accompanied Congressman Torres on a walking tour of some of the businesses in the area and they had indicated to the Congressman that they had concerns. So, the mayor pro tem wrote to us and said that these concerns are there and we think that you ought to investigate. We are looking very favorably at this hearing to identify the people with concerns and, perhaps, identify a vehicle to meet those concerns.

Mr. SKELTON. I think you will have the opportunity this afternoon, sir.

How many years are left for the use of the BKK landfill at the present rate of use?

Mr. KAZARIAN. Under the present rate of consumption of the cubic yardage space, because it is like a warehouse, we are looking at 20 plus years.

Mr. SKELTON. How many? Plus-20? Best ball park judgment.

Mr. KAZARIAN. The last number was a round number of 25 years.

Mr. SKELTON. In your opinion then, there would be 20 to 25 years of future use at the present rate of usage. Is that correct?

Mr. KAZARIAN. Yes, sir. I think it is important to note, though, the primary material which is filling the capacity of the site is not hazardous waste. It is what is considered nonhazardous waste, municipal refuse.

Mr. SKELTON. Now, have you seen an increase or a decrease or generally the same level of use for your landfill over the last several years?

Mr. KAZARIAN. With other closures, we have seen an increase in the number of vehicles.

Mr. SKELTON. So, my question, which elicited the answer of 20 to 25 years was based on the present rate, but with an increase, would you care to give your best judgment as to whether 20 to 25 years would still be the accurate figure?

Mr. KAZARIAN. There are so many different scenarios——

Mr. SKELTON. Your best judgment is what we are looking for.

Mr. KAZARIAN. It is highly dependent on other closures. If the Puente Hills landfill were to close, we have seen estimates that would cut the operating life of our landfill substantially approximately in half.

Mr. SKELTON. So, what we are going to have to do somewhere along the line in our lifetime, hopefully, is to find an alternative solution to the BKK landfill. Is that not correct?

Mr. KAZARIAN. Yes. We deal on two different issues in the landfill. We deal with the solid waste issues, which is an issue all in itself in cogeneration, but there are people looking for alternatives for the disposal of all types of material at this point.

Mr. SKELTON. Let me talk about the pond, if we may. Learning long ago that water runs down hill and seeing a pond at the bottom of your landfill, I asked the question of one of your gentlemen earlier this morning, was your pond tested for contamination and I was told that it was not tested because it was used on premises.

In talking, I think, with Dr. MacKay and Dr. Perrine, this caused me concern because it can be as a result of their testimony a vehicle whereby contaminated water collects in a pond and is used to clean trucks, is used to spray down the dust and used in other areas on the landfill premises itself. It can be a way of contaminating other parts of the area that are blocks and miles away from the landfill itself.

First, is it not true that you do not test that pond? Is that correct?

Mr. KAZARIAN. I would like to turn these answers over to Mr. Joe Johnson.

Mr. SKELTON. All right. Mr. Johnson, do you test that pond?

Mr. JOHNSON. We have been required by the Regional Water Quality Control Board——

Mr. SKELTON. Now, wait a minute. My question is, do you test that pond?

Mr. JOHNSON. To my knowledge, we have not drawn a specific sample out of that pond.

Mr. SKELTON. Right. Let me ask you again. Do you test that pond? Yes or no?

Mr. JOHNSON. No.

Mr. SKELTON. All right. Now, you may explain your answer.

Mr. JOHNSON. OK. We have been required by the Regional Water Quality Control Board periodically to test runoff from the landfill facility, starting 2 years ago. So, during each winter season we take samples of the water that flows during a particular storm event down the canyon to assure ourselves and the regulatory agencies that no toxic material is leaving the site. It is that same water that enters into this pond as one stage of its drainage from the facility.

The pond is there to allow a little bit of time for the solid material, the silt and dirt, to drop out of the water prior to discharge from the facility into the city's storm drain system.

Mr. GASTELUM. Mr. Chairman, may I add that we are commonly asked to test all aspects of the landfill. I don't think we would have any objection to testing the water in the pond. I apologize that we hadn't thought about it earlier.

Mr. SKELTON. I am not the one to whom the apology goes, sir. We merely elicited the fact that this is a potential problem. Hopefully, it is not a problem. I appreciate your volunteering to do that and if you so desire, should you have any tests in the next few weeks, the results of that test would be gladly made part of this hearing.

Mr. KAZARIAN. Mr. Chairman, one more thing that I think we need to point out. The majority of the water that is in that pond is runoff, which, by design, is caught so it will not run through the facility.

Mr. SKELTON. We understand that; however, if the two good doctors are correct, it is not solely rainwater because it is other permeated water, which collects, the amount of which you and I don't know.

Yes, Mr. Johnson.

Mr. JOHNSON. Mr. Chairman, I would like to make one comment. Both of the learned gentlemen that testified before we came up here to the stand admitted that they had no intimate knowledge of the site, and I can categorically state that there is no leachate or permeate going into that pond.

Mr. **Skelton**. Thank you, Counsel.

Mr. **Torres**. Mr. Chairman, if the gentleman would yield?

Mr. **Skelton**. Yes, please.

Mr. **Torres**. Thank you. I was too hasty in not continuing with additional questions and before we move on, I would like to raise one that I think is important for the record. Do you have now a record of the hazardous waste received at BKK?

Mr. **Kazarian**. All incoming loads are entered into our computer. We not only keep a copy of the waste manifest, but also a computer copy. I cannot say exactly if we have every load back to day one, but whatever has been required of us by law, we have all those records intact.

Mr. **Torres**. Now that we know that there is a semblance of record, will your corporation assist this subcommittee in studying the manifests and the content of the BKK landfill and assist us in a comprehensive analysis of such data?

Mr. **Kazarian**. Yes. There will be no problem with our company. We have provided manifests and this information to other governmental agencies in the past and have no reason not to cooperate here.

Mr. **Torres**. While we were at the landfill this morning, we were able to notice the flow of traffic entering the landfill and it was sizable to be sure, but I have no real measurement of what is sizable. I think I raised with you the possibility that we would like to know as a subcommittee how many vehicles or trucks you had last week as opposed to this week? I am talking about the week of May 23 and the week of June 30.

[Mr. Kazarian submitted the following response to Mr. Torres' question after the hearing:]

(1) Week of May 23, vehicles transporting hazardous wastes *747*.

(2) Week of June 30, vehicles transporting hazardous wastes *832;* vehicles transporting nonhazardous wastes *3,840*.

Mr. **Kazarian**. I was unable to grab those numbers this morning. I generally talk in terms of tonnage and not truck movements, but we will be happy to go back to our computers and we can break it down any way you would like it, if you would like solid waste vehicles, tankers, trucks, and we can break down the number of trucks exactly and submit it to——

Mr. **Torres**. I am specifically addressing my inquiry to hazardous waste, whether it is in liquid or solid form. I would like to ascertain, last week's tonnage as opposed to this week's tonnage.

Mr. **Kazarian**. We would have to go back to the record, round numbers for total hazardous waste vehicles averages, I believe, on a yearly basis of somewhere around 100 to 110 vehicles. Those are just off the top of my head and, as I stated before, we will be very happy to go back into our computer records and give you the exact data for any dates that you wish.

[The material referred to above is on file with the subcommittee.]

Mr. **Torres**. Thank you. Mr. Chairman, this question, is to the general counsel for the BKK Corp. I am not sure if it was answered earlier, but I would like to ascertain whether BKK is legally liable for the loss of business as a result of spills, which force closures or drive customers away from business centers near the landfill? Has this been raised with your corporation?

Mr. **Gastelum**. No, it has not. As I stated earlier, the only formal presentation that I am aware of is the letter from the mayor pro tem.

Mr. **Torres**. Lastly, and I think it has been discussed amply by others, but I would like to hear BKK's position on this. What are some of the problems you feel warrant legislative action regarding the regulations imposed, if you will, upon companies doing business in the hazardous waste industry. You talked about sizable companies here in the congressional district. These are the generators of hazardous waste. What about the people like yourselves who operate a hazardous waste receiving landfil? What sort of legislative action do you feel is necessary?

Mr. **Kazarian**. There are a couple different issues. On the overall picture as far as trying to continue to service industry and protect the public and operate hazardous waste disposal facilities, one of the major problems is we see major, fragmented regulations. When I say "fragmented," we have several different agencies, as was evidenced earlier this morning, just within the State. On the Federal level, we don't deal with quite as many different agencies, but we see many times where either one or two State agencies may have conflicting ideas on where they want to go in the future.

The State of California is moving to ban hazardous waste disposal for certain types of waste; yet, the Federal Government, the general push is not to ban landfilling. It is just to regulate the land-disposal practices a little tighter. As a service industry, we have to look and get direction from all the Government agencies to know which way we are supposed to go so we can stay in business basically and serve our customers.

I think a good, hard look at all the different rules and regulations and philosophies of where do we want to go in the future must be thoroughly examined and streamlined. We see areas in the transportation business—one problem that we have seen that we frankly do not know exactly how to deal with yet, except for on an individual basis, has been a back-door cause of regulation, which has caused the spills.

As the price for land disposal, for all disposal practices has gone up, taxation, variety of reasons, industry has made attempts to dewater and lower the volumes of their wastes. Now, they haven't gone all the way, but they have lowered the volumes. What has resulted is, instead of having very liquid pumpable materials that are considered hazardous waste, we have ended up with things that are not—you really would call them a sludge. It is not a cake. They are not adequately pumpable, but they can be carried in open-top containers and those vehicles can be registered to carry hazardous waste.

Now, certain solid hazardous waste has to be carried in something like a dump truck, but we have seen things that you could literally swim in come into the landfill in dump trucks. Now, the way that we have dealt with this in the past is when we see someone trying to transport materials like this, we just tell them not to come back. We do not like to see that material on that truck unless they tighten it up, either by taking the water out, pumping it into a vehicle that can contain a liquid, adding dirt to it, all these different functions.

But right now, you quite literally, if you have got a truck that you could fill with water and you register it for hazardous waste, you can put anything in it as long as you have got your sticker on your truck and haul it down there. One good hit on the brakes and it comes sloshing forward.

Now, this is something that we are interested in. With our own vehicles, we are redesigning containers because we see the waste being generated, changing. So, we have to change the vehicles. The laws are not necessarily keeping up with that, so, these are certain areas we think need to be looked at.

Mr. TORRES. Thank you. Mr. Chairman.

Mr. SKELTON. I would like to touch on the business aspect, just to give you an idea of what has been brought to this committee's attention. An April 5, the San Gabriel Valley Tribune article headlines, "Thirty Evacuated From Restaurant After a Chemical Spill on Azusa Avenue Offramp." It goes on to say that the manager of the restaurant said 6 employees and about 25 customers were evacuated from the restaurant at 11:15 a.m. Employees were sent home, he said, and not called back to work until the reopening at 3:30 p.m. I haven't figured out how much money we lost yet, but it is hundreds of dollars.

A letter from a Jean Arneson of West Covina contains this:

> When a dark cloud hangs over BKK hills, I wonder if there is a fire at the dump and how will we residents evacuate if necessary. When I hear sirens on Azusa Avenue, I wonder if there is a tanker accident, a policeman overcome by fumes or trouble at BKK. Shopping in that area would be convenient for me. I go to the stores north of BKK, but driving by the dump to the other specialty shops and Puente Hills is no longer for me.

These are the kinds of concerns that concern us as a small business subcommittee. Are you aware of this type of concern by the local populace?

Mr. KAZARIAN. Yes, sir. We are as deeply concerned about people's fears as anyone on the subject. We feel that many times certain regulatory steps as far as response to spills, everyone has a set of specific rules they must follow as far as the agencies are concerned. They are designed, again, on worst-case scenarios. They may protect the public, but in the long run they also serve to evoke fear in people's minds.

We have been working very hard to try and help the situation as much as possible. Again, we feel that by working with the agencies, with our response vehicles, providing training and all the personnel necessary to go out and clean these materials up, that we will be able to shortstop many of the things which just serve to confirm in people's minds the fear, not necessarily because there was that much of a hazard, but someone's manual stated that when you block traffic, for example, Los Angeles County roads has a specific method of blocking off traffic because of how many people are responding. If you have got 10 people or whatever, you have to have x number of cones going down 2 miles.

Well, one not sophisticated on the subject would assume that that area was blocked off because a danger was in that area. It may be for no other reason than because of an insurance company's request on how the personnel are to be protected from the traffic. So, we have been trying to work in those areas.

We feel that—and West Covina is no different than anywhere else—the overall perception of hazardous waste in this country is a problem. We feel that hearings like this in the long run are going to make people feel a little better about present-day practices. We certainly do not want anyone to think that we condone any of the practices of the past, which caused problems.

We think that we are providing services that, when better understood, people will understand we are providing a service needed, so we won't see more of those problems come up in the future.

Mr. **Skelton**. I have one last question, Mr. Kazarian.

What is this lady referring to when she refers to a "dark cloud that hangs over BKK hills?"

Mr. **Kazarian**. I have no idea, sir.

Mr. **Skelton**. Thank you. Counsel.

Mr. **Orban**. Yes. Thank you, Mr. Chairman, and I see we are coming close to time, and I want to save some time for Dr. Simpson, but I have some questions that I think should be on the record.

First of all, what plans are you pursuing for use of BKK after you are finished filling it with waste?

Mr. **Kazarian**. We have final grades which have been looked at as far as what the facility will look like. Right now, consideration is being given for recreational uses, very similar to what we see at Industry Hills, golf courses, equestrian trails. It is difficult to look 20 years into the future or even 10 years into the future and adequately predict what the recreational needs or any other needs may be, but we do, every few years we look at what the basic trends are in the area and update it. Right now, we are calling for recreational uses.

Mr. **Orban**. Is there currently, or is one of the considerations you are thinking about in the future, any farming activity taking place on the BKK land?

Mr. **Kazarian**. The fill land would not be appropriate for farming and I doubt very much that what land is on the hilltops would be economically feasible to be using it for farmland. There has been some grain grown there in the past. This whole valley was grazing property. The hilltops were basically the only thing left for a few of the local farmers to use.

Mr. **Orban**. But that doesn't continue any more?

Mr. **Kazarian**. I am not really sure——

Mr. **Gastelum**. Let me clarify. I believe there may be some grain farming on the top side of the landfill. It is all in virgin soil. It is not below in any sense the fill.

Mr. **Orban**. So, Mr. Kazarian's statement about the suitability of the landfill for grain is talking mainly in the future after you have filled everything up and doesn't refer to the virgin soil area or——

Mr. **Gastelum**. No, we have no plans at all for large-scale farming at all. It just occurred that a farmer wanted to lease some land. It is an efficient way for us to keep down the weeds and to manage that part of the landfill. It is quite a distance from the fill area.

Mr. **Orban**. Is there a classification on that land now?

Mr. **Gastelum**. Classification in what sense?

Mr. **Orban**. Classified for waste.

Mr. **Gastelum**. Not, it is not classified for waste.

Mr. **Orban**. You don't expect to use it for waste or you may sometime in the future. OK, give me a ball park figure, if you would, based on your experience of the businesses that use BKK, how many of those businesses would you categorize as small businesses? Use your best judgment on small businesses, but let's say $5 million gross. Are we talking about the major users of BKK being small businesses?

Mr. **Kazarian**. I would have to say the majority of the users would be considered small business in that context. We have seen approximately 5,000 different companies on the manifests recorded as generators of hazardous waste.

Mr. **Orban**. Why don't the big users use BKK in your judgment?

Mr. **Kazarian**. Well, no. They are using our facility also.

Mr. **Orban**. They are not switching to onsite, for example, or treating their own waste?

Mr. **Kazarian**. Well, some facilities have onsite land disposal, land farming, some of the petroleum companies, the refineries, have onsite disposal. The whole philosophy of why we exist in this industry would be—I think the easiest way would be the same reason they don't have a refinery next to every oil well. You need regional facilities for economy of scale.

Mr. **Gastelum**. Mr. Orban, may I add something here for the record. The State of California recently did a survey of generators of hazardous waste and where they dispose of their waste. Of the wastes that are generated in the State of California, according to these figures 0.6 percent are disposed at offsite facilities like the BKK landfill. The vast majority of wastes that are generated are disposed of either onsite by large generators or through the municipal sewer systems. We could provide that State of California study.

Mr. **Orban**. I think we have it and I believe it showed something on the order of 70 percent was treated onsite. I think it was 3.7 million tons out of 5 million tons were treated onsite. I was trying to get a feel for whether that reflects big generators who can afford their own onsite facilities or their own treatment and then the small businesses are left to landfills. Is that your judgment?

Mr. **Gastelum**. Our judgment is that small businesses are left to landfills or rely on municipal sewer systems, but there is growing evidence that there is quite a bit of abuse of municipal sewer systems.

Mr. **Orban**. For their hazardous waste, they rely on municipal sewer systems?

Mr. **Gastelum**. Yes.

Mr. **Orban**. The least expensive method, let's assume, is to drive to BKK or another hazardous waste landfill and deposit your toxic waste there. What is your judgment as to what would happen if there wasn't such an economical method, such a low-cost alternative?

Mr. **Gastelum**. I can only say what the experience has been in the past and that is that the sewers have been the lowest cost alternative, that local agencies are finding that substantial quantities of hazardous wastes are going into the sewers and that small businesses have extensively relied on landfills such as ours.

Mr. **Orban**. Do you know of any support for that statement?

[The material referred to above is on file with the subcommittee.]

Mr. **Gastelum**. I think that the Los Angeles County strike task force is the best source. That comprises a number of agencies in the area, which is most involved in this question.

Mr. **Orban**. Could you provide information that you may be aware of along those lines, whether it is published by the task force or not, to this subcommittee for our review?

Mr. **Gastelum**. Yes.

Mr. **Orban**. OK.

Mr. **Kazarian**. If I could make one addition just along that same line. We received a phone call this morning just before coming to the hearing from a lady, and I don't have a name, who wanted to come to testify today. She just recently inherited a small plating business in La Puente and had heard one of the news articles from the press releases and was concerned that there may be a problem. She just merely made the statement to us, "I can't afford to drive any farther than West Covina."

Mr. **Orban**. Let me turn it over to Dr. Simpson.

Dr. **Simpson**. As we have heard from Mr. Torres earlier on, we have established some semblance of recordkeeping. We also had the opportunity this morning to see somebody who was like a foreman directing trucks where to offload. Do you have maps indicating exactly where each waste shipment has been placed in the past?

Mr. **Kazarian**. We have a grid system which tells us where each specific day's deposits were going.

Dr. **Simpson**. Do you have a monitoring program to see if any of the wastes that are put into each of these cells has migrated horizontally, as Dr. MacKay suggested could happen to the fractured region?

Mr. **Kazarian**. We don't specifically test for lateral migration from one burial cell to the other. Our system is no different than, as far as the geology and migration is concerned, than the commingling aspect. We are no different as far as geology is concerned than the ponding operation. We have to meet the same regulations whether we commingle it with trash to absorb it or we merely dug a hole, built a pond and a 20-foot-deep pond of liquid materials in it. We operate under the same conditions.

Dr. **Simpson**. So, if there was some regulation stating that there needed to be a monitoring system around each cell in order to keep in business, you would conform with that requirement?

Mr. **Kazarian**. We will conform with any regulations. I am not really sure that I understand where we are going because the way I am understanding you, it may not be practical, but we are willing to discuss these things.

Dr. **Simpson**. OK. You also mentioned that by some method acidic solutions are neutralized down in San Diego. Are you adding a base to the acidic solutions or what is it you are adding to it to neutralize it?

Mr. **Kazarian**. Well, it is dependent on the material. Sometimes we can merely use caustic waste products and react them in a controlled situation with acidic waste products and come to a neutral base there. Other times we use lime slurries, which are a byproduct from a couple of manufacturing processes that have been very effective as far as giving body to the sludge cake and neutralizing the acidic materials.

Dr. SIMPSON. When the solution has been neutralized either by addition of a caustic chemical or some other type of base to the acid, as I remember my chemistry, what you end up with is not just water. You also end up with a salt. Is that salt precipitated out with the heavy metals?

Mr. KAZARIAN. Yes, the salt and all other solids are precipitated out. The only thing we end up with is the water.

Dr. SIMPSON. OK; now, the filter cake, as you called it, is covered with some sort of compound to decrease its water solubility. Is that some kind of hydroxide compound?

Mr. KAZARIAN. I am going to let Joe answer that a little bit.

Dr. SIMPSON. OK.

Mr. JOHNSON. A couple of different things, if we can go back just a moment. All the salts, obviously, don't come out. We are using a belt filter press and the belt filter removes the solids, which are metal precipitates, and it is a 2-stage process, which is accomplished at two different pH's.

What was your question then?

Dr. SIMPSON. The filter cake is coated with some kind of compound, which decreases its water solubility. Is that some kind of hydroxide, or can you tell me about that?

Mr. JOHNSON. No. The press cake coming off of the filter press contains the metal hydroxides, which were removed through conventional chemical precipitation techniques, and other solids which may be just simply filtered out by the press, but in the solid form in which it is transported to the landfill then, it is essentially nonwater soluble.

Dr. SIMPSON. Is there a coating placed on it at all?

Mr. JOHNSON. No.

Dr. SIMPSON. The cake that is left over that is actually transported to the landfill, is that soluble in an organic solvent?

Mr. JOHNSON. We haven't run those tests since we are permitted at our landfill to accept anything at this particular point in time. We are simply transporting that material to the landfill and disposing of it. Considering the valuable metals which are a large portion of this sludge, we are considering currently designs, which will allow us to dispose of that material in a separate area, so it can be, perhaps, mined in the future. Also, it is certainly possible to encapsulate that, make it by EPA definition nonhazardous.

Mr. KAZARIAN. By definition on the residues there have been a couple of instances here in the United States where in certain regions of the EPA treatment systems have had their residues downgraded or declassified to nonhazardous status. The State of California, though, in the past has had a leachate testing. Their leachate testing was such that even concrete would not pass that leachate test for leachability. So, therefore, given the current rules and regulations there is no system available anywhere in the world which will produce a residue which would ever be considered nonhazardous under that test, that specific leachate test. So, therefore, we haven't gone into it.

There are solidification systems that are more costly that can be used to encapsulate these things to where I think you could categorically say they are nonhazardous. We still go back to the No. 1 thing, though. We don't want to ingest them and there are many other things in this room we wouldn't want to ingest that would not fall in that same category.

Dr. SIMPSON. Mr. Johnson, I take it then that you are looking into plans to segregate out these filter cakes so that they won't come into contact with organic solvents which could break them up and dissolve them?

Mr. JOHNSON. That is correct.

Dr. SIMPSON. Do you have plans to extract energy from your landfill?

Mr. KAZARIAN. We are currently investigating a system that will use the methane, which is now being burned and flared, and use that system to turn a turbine and turn electric generation, turn it into electrical energy. Until recently we have not felt that the system was large enough to make this system practical. We feel that the system is complete to the point where we can look at using this energy source instead of just burning it into the atmosphere.

Dr. SIMPSON. On a previous panel it was mentioned that there needs to be some sort of choice or selection made as to whether the flare system is going to be used for odor control or energy recovery, if you are going to do either one of those well. What criteria have you used to choose between odor control or energy recovery?

Mr. KAZARIAN. The thing that dictates that is not necessarily the flaring system. Once you have the gas, if you have a source that has enough Btu value and energy value, then it makes no difference whether you burn it in a flare or you turn it in a turbine. The choice needs to be made early in the system though as to whether or not you are going to go to control emissions or try and extract high Btu gas. The high energy gas generally comes from the center of the landfill, whereas the odors and the emissions problems come from the outside edges.

The gas collected from the outside parameter of the landfill generally is lower Btu gas because, in effect, we are putting the landfill under vacuum and drawing air from the outside atmosphere in and diluting that gas source. So, in the past companies who wanted to generate energy were not interested in that gas. So, we made the decision to go after that system. We have now designed a system large enough and technology has come along that allows us to use the lower Btu value gas and now will allow us to look into making the energy.

Dr. SIMPSON. Do you have any accompanying plans for an air monitoring system to go along with that?

Mr. KAZARIAN. Air monitoring is a continuous part of the whole system and before we would ever be allowed to construct the facility to generate electricity, it would be reviewed with all the agencies as far as efficiency, the amount of burn, the volume of destruction of any particulates in the gas.

Dr. SIMPSON. Would it be possible that you would have two flare systems, one to take care of odor and one to take care of energy?

Mr. KAZARIAN. Well, I think we get back to the collection system. There will be a flare system no matter what is put up there to generate electricity for certain down times for maintenance. You wouldn't want to just shut the system off and let the pressure build up. So, it would operate very similar to what we have now. We have a dual collection system up there right now.

Dr. SIMPSON. OK. What about seismic activity monitoring? What provisions do you have to see if your land has moved around?

Mr. KAZARIAN. I am going to let Joe answer that.

Mr. JOHNSON. We have had various seismic reviews of our site done by our consultants over the years. Probably the best answer is we have no monitoring in place for what happens during seismic activity, but these facilities designed under California's regulations have shown very good survivability in an earthquake event. The Kettleman Hills facility recently survived without any damage from the Coalings earthquake and Mission Canyon and Calabasas landfills here locally operated by the Los Angeles Sanitation Districts went through the Sylmar quake back in 1971 without any damage.

Dr. SIMPSON. Do you know what happened to the municipal landfill in Coalings during that earthquake?

Mr. JOHNSON. No, I don't.

Dr. SIMPSON. Do you have any plans for instituting some sort of seismic monitoring program at BKK?

Mr. JOHNSON. We have no specific plans at this point in time.

Dr. SIMPSON. OK. This morning we were driving around and we came to a dead end somewhere around Nogales and Amar. Are you familiar with that area? There is a dead end around there.

Mr. JOHNSON. Yes.

Dr. SIMPSON. And that is below your fence line. Am I correct?

Mr. JOHNSON. That is correct.

Dr. SIMPSON. I notice you have signs there indicating that it is a hazardous area and people are not supposed to go in there. It is bilingual. There are some watering pipes out there, which I guess are out there to water the plants. Is that what those pipes are there for?

Mr. JOHNSON. That is correct. We have an irrigation system as required by the city of West Covina to keep the hillsides green.

Dr. SIMPSON. City water is being pumped through those pipes?

Mr. JOHNSON. That is correct. All of our irrigation system is city water.

Dr. SIMPSON. The city water pipe goes 1,400 feet past the entrance and also goes around your facility, or where does it end?

Mr. JOHNSON. It goes from the entrance clear up to the equipment and office building area. We also bring a pipeline in on the backside of the landfill on the southwest side and run it up to the top of the hill so we can get pressure to the sprinklers at upper elevations on our south facing slopes.

Dr. SIMPSON. Has there been any problems with heavy equipment fracturing the lines somewhere causing a pipe breach or a break or anything else of that sort?

Mr. JOHNSON. Not that I am aware of.

Dr. SIMPSON. I have one final question. The U.S. Congressional Office of Technology Assessment not too long ago released a review wherein they looked at both the Resource Conservation Recovery Act and Superfund and they came to the conclusion that both suffer from inadequate data requirements, inadequate in the sense that they don't seem to fully protect human and environmental health.

Now, if the landfill satisfies all regulations and, yet, there is still public concern about the landfill, does the problem lie less with the landfill and more with the regulations? Is that what one should conclude from all this? Is that a BKK position?

Mr. KAZARIAN. That is a very far-reaching question. It is not simple to say "yes" or "no." Some of the problems are we are an industry which is regulated by law. The simple function of meeting all rules and regulations has not been acceptable to many people to say that it is an acceptable practice. The whole issue of hazardous waste in this country is now something that everyone is concerned with.

We are taking the position in the State of California where we are functioning right now that if the State is going to move to alternatives to landfilling, we are going to move in that direction. Alternatives are a more satisfactory way of disposal to most people. They have some very practical reasons why they are more acceptable. One simply is that it has longevity.

Probably one of the largest problems goes back to what we talked about, fragmented regulations. We have so many people regulating these substances. By virtue of the fact that the moment you want to throw something away if it meets that criteria, it is considered hazardous waste. Five minutes before it could have been hand cleaner. And as soon as we call it hazardous waste, it falls under volumes and volumes and volumes of regulations and it does nothing but evoke fear.

We have seen people who came stomping in upset about hazardous waste. When they finally find out what it was, they said, "Oh, that is what I wash my hands in every night before I go to work. I am not worried about that stuff." So, I think part of the problem is also understanding the semantics of this industry. Years ago, these materials were called nonsewerable, industrial liquid wastes and we never had anybody afraid of it. So, I think the whole issue is one that needs to be looked into deeper.

Dr. SIMPSON. Thank you.

Mr. ORBAN. If someone were to drive up with a truckful of PCB's, what stops him from going into your landfill?

Mr. KAZARIAN. The PCB industry is an industry in itself that has been regulated for those specific materials. The only PCB materials that ever come into our landfill are contaminated soils that contain less than 50 parts per million and by EPA definition are considered not to fall under the other rules and regulations.

Mr. ORBAN. If he wants to lie on his manifest, what stops him from dumping?

Mr. KAZARIAN. Well, No. 1, as soon as it says "PCB," we require a test. We have gotten into that situation and we want to see lab analysis. If he has obviously large volumes of liquids or other materials, we don't accept them.

Mr. SKELTON. I have two letters, each speaking of the dependence of their operations on the BKK landfill, favorable to your operation. One is signed by Charles J. Rusackas, who is president of the CEJER, industrial and institutional chemical specialties of South Gate, Calif., and the other is signed by Patrick Rusackas of the PFR Waste Specialists of El Monte, Calif., and without objections, Mr. Torres, I will make these as part of the record.

[The two letters referred to above follow:]

-CEJER-

INDUSTRIAL AND INSTITUTIONAL CHEMICAL SPECIALTIES

CEJER Company 2545 TWEEDY BOULEVARD SOUTH GATE, CALIFORNIA 90280 TELEPHONE: (213) 564-1145

May 31, 1983

Honorable Ike Skelton, Chairman
Sub-Committee on Energy & Environment
Committee on Small Business
12440 E. Firestone Blvd., Suite 117
Norwalk, California 90650

Re: BKK Sanitary Landfill
West Covina, California

Dear Sir:

It has been brought to our attention that you will be conducting a hearing on June 3, 1983 regarding the BKK Landfill.

This is of great concern to us as we are very much dependent on this operation, and we are anxious that you are not unduly influenced by complaints of people that do not give due consideration to all factors concerned.

It is distressing to us that some people give much trouble over relatively minor incidents and do not make any allowances for the human element or see different factors in relative importance.

Considering all that is dependent on allowing BKK to continue to operate, and the relatively few "accidents" that occur, we hope that your committee and you will rule favorably for BKK.

Very truly yours,
CEJER Company

Charles J. Rusackas
President

CJR/jmm

JUN 03 1983

PFR WASTE SPECIALISTS
10528 Lower Azusa Rd. #135
El Monte, CA 91731
(213) 960-6106

May 30, 1983

Dear Mr. Skelton,

It has come to our attention that a hearing is being held concerning the effect BKK Landfill has on the small businesses in the community.

This is an issue in which we are very much concerned. Our business was founded on the idea of serving the small hazardous waste generators with a low cost service. We service many dry cleaning shops as well as other small businesses in West Covina and surrounding communities.

The BKK Landfill plays a most vital roll in servicing the four local counties and the thousands of businesses who generate hazardous wastes therewithin. If these small quantities of waste will be required to be shipped 200 miles away the prices would skyrocket resulting in either increased illegal disposal, relocation of businesses, or stifle the establishing of new businesses in the area.

Closure of BKK would impose hardships on many, many businesses including ours. We rely on the use of small trucks with gas efficient engines to service our customers (over 600 accounts). We could not afford to use larger trucks that would be necessary for the long haul and therefore would have to abandon our small business.

I plead with you to study carefully all the facts involved and I trust your ruling will be the best for the welfare of Los Angeles, San Bernardino, Orange and Riverside counties.

Thank you for taking this letter under consideration.

Sincerely,

Patrick Rusackas
Patrick Rusackas
Owner/Manager

JUN 0 2 1983

Mr. SKELTON. We are making legislative history today. We are operating on time. We will adjourn until 12:15. Thank you.

[Whereupon, at 11:45 a.m., the hearing recessed, to reconvene at 12:20 p.m., the same day, Friday, June 3, 1983.]

AFTERNOON SESSION

Mr. SKELTON. We will resume our hearing. We are doing pretty well staying on time. The next witness is Stephen Sherrill, the battalion chief, Los Angeles County Fire Department, Los Angeles, Calif.

Chief, welcome and we appreciate your being with us here.

TESTIMONY OF STEPHEN SHERRILL, BATTALION CHIEF, LOS ANGELES COUNTY FIRE DEPARTMENT, LOS ANGELES, CALIF.

Mr. SHERRILL. Thank you, Mr. Skelton.

Basically, I manage the hazardous materials response program for Fire Chief Clyde A. Bragnon under the Operations Bureau Deputy Chief Ron King.

I have some pictures for the commission. I apologize for our xeroxing capability. However, as you know, we had a notice problem and we didn't receive the notice of the hearing until yesterday or, excuse me, later on the 1st.

Should the subcommittee have any questions, we will be more than happy to answer them as soon as we possibly can.

In 1982, the county of Los Angeles Fire Department embarked upon a program to address the ever-increasing instances of hazardous materials that we are being faced with.

Our department serves 44 cities initially and provides mutual assistance agreements to 39 other cities. The units that you are seeing in front of you, Hazardous Material Squad 105, is stationed in the unincorporated area adjacent to the city of Carson and Hazardous Material Squad 87, which is the other unit, is stationed at Valley and Second Street in the city of Industry and it is quite proximal to the city of West Covina and available to them upon request.

The units are manned 24 hours a day with a captain and four firemen. Each unit has the capability of outfitting 23 people in different degrees of protective clothing pursuant to the hazardous materials involved. Each captain has over 800 hours of training and each fireman is approaching 400 hours. There will be another 100 hours of training provided to these individuals before the remainder of the year.

As you can see the suits in the picture in front of you, they have the capability of utilizing suits for class A chemicals, in other words, something that would be highly poisonous; splash suits for a basic operation; fire suits in case it is a chemical like butane or something that is highly flammable or provides a lot of intense heat; and then they have the capability of having fire oversuits, which are also aluminumized so they can handle something that is toxic and flammable.

The units carry a tremendous amount of equipment. They carry different degrees of monitoring equipment for handling basic types of incidents. They are respondent on all hazardous materials incidents within the county of Los Angeles Fire Department jurisdiction, all greater alarm emergencies, and are available to any incident commander upon request.

They are also available to any city upon request.

Basically, Mr. Skelton, that has been our program so far. We have worked very hard to address something that is, I am sure, of interest to everybody here. They are averaging about a hazardous materials incident a day and this——

Mr. SKELTON. Throughout your entire area?

Mr. SHERRILL. Yes, and we average about 114 incidents of consequence, which I consider to be where we had working incidents for the last 10 months of 1982.

Mr. SKELTON. Congressman Torres.

Mr. TORRES. I have no questions at this time, Mr. Chairman.

Mr. SKELTON. Can you tell us, Chief, about the number of incidents that you have on Azusa Avenue as a result of BKK landfill? Do you have any records on that, sir?

Mr. SHERRILL. Since August 20, 1982, I have eight incidents. That is in the city of West Covina and within our own area.

Mr. SKELTON. In other words, you had to send your unit out on eight different occasions?

Mr. SHERRILL. Since August 1982, yes.

Mr. SKELTON. On each of those occasions was traffic stopped, the spill of such extent that there was a problem with the traffic control?

Mr. SHERRILL. Anytime we have a spill, we will reroute traffic and we will make every attempt to isolate the area initially; after that we have an assessment. The answer to your question is, I would say "yes," for various periods of time.

Mr. SKELTON. Have you had complaints to your department or comments to your department concerning the small business owners in the area that have been affected by these traffic blockages?

Mr. SHERRILL. I think we have had some discussion on certain specific incidents. Some of our relationship in this area relates to the time to get the incident cleaned up.

Mr. SKELTON. Counsel.

Mr. ORBAN. Thank you for being able to appear with us today. I know it was difficult for you.

I am looking over the array of equipment you have here and I must admit that it is impressive. I also admit that I am sorry that it is needed; that we have these types of spills, but at least we have some kind of response.

You mentioned that from August until the present date there were eight incidents that you know of.

Mr. SHERRILL. No. That we responded on.

Mr. ORBAN. That you responded to. Isn't it true that you are, let's say, the second group called with West Covina, their response team, being the first group called. So, can we assume that when you show up, it is one that they need some extra help on?

Mr. SHERRILL. Under the conditions of the spill, if it was to occur in the city of West Covina, I would assume that they would get the request for aid, come to the incident and then determine whether they need us.

Mr. ORBAN. Whether they needed you.

Mr. SHERRILL. Yes.

Mr. ORBAN. We will hear from them later, I am sure, but they have their own environmental response——

Mr. SHERRILL. No. The proximity of this unit at Valley and Second is less than, I would say 2½ miles from the BKK facility and they are using us under a mutual assistance agreement rather than create a duplication of resources.

Mr. ORBAN. I thank you very much for taking the time to be with us today. I have no further questions, Mr. Chairman.

Mr. SKELTON. Congressman Torres.

Mr. TORRES. Given the nature of spills in the area, what would you suggest that a body like ours, Federal legislators, could begin to do to assist the county and try to preempt this situation?

Mr. SHERRILL. I believe some action has already been taking place in the assessment of these spills. From the Federal end, I think we need support for our programs. In the county of Los Angeles, where it is estimated that between 11 and 17 million tons of hazardous materials are transported within the State of California and from previous studies and especially 1979, a road department study within the county of Los Angeles, it is estimated that the county of Los Angeles as a whole has approximately 50 percent of the State of California's traffic of hazardous materials through the county of Los Angeles.

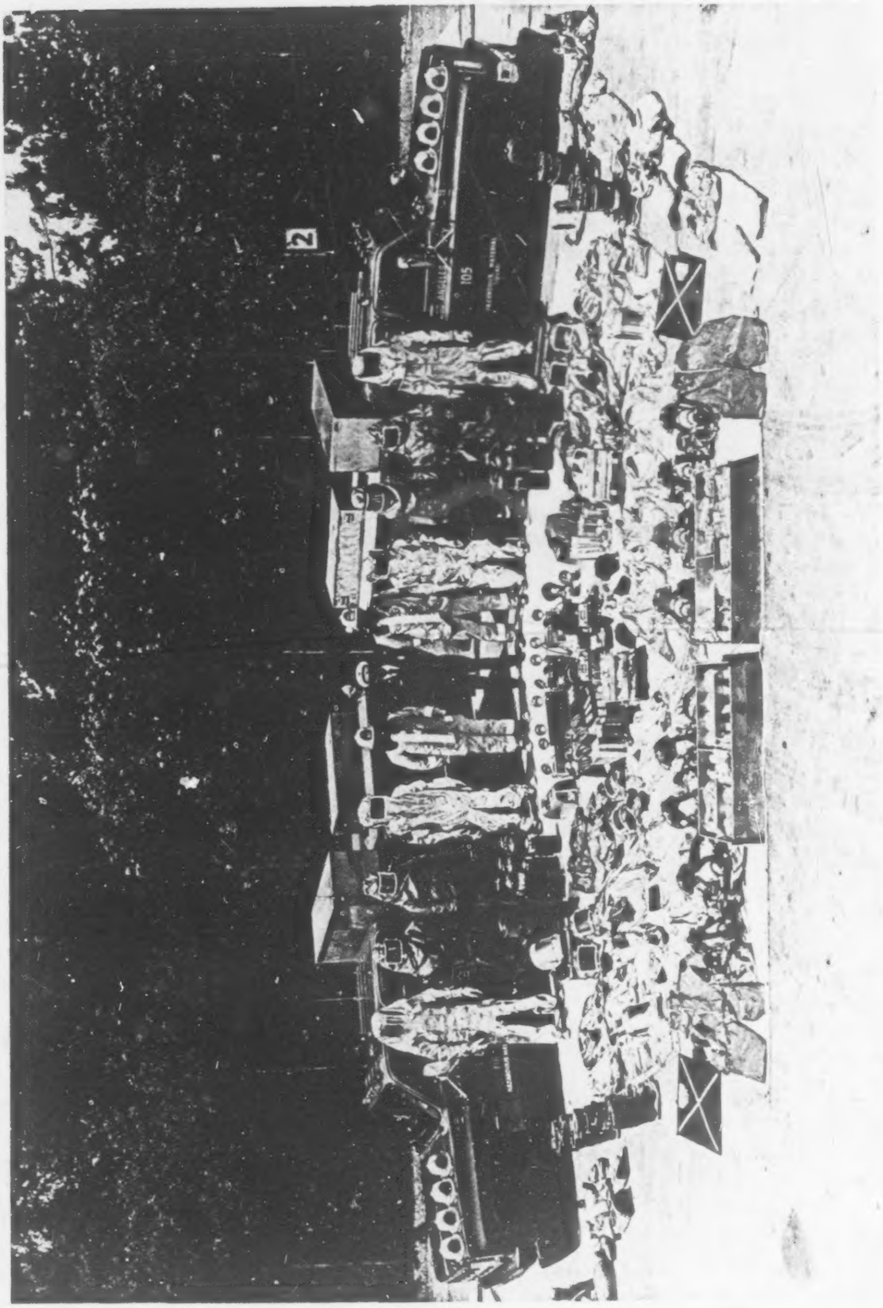
Mr. TORRES. Do you feel perhaps a greater restriction on speeds, the reduction on the utilization of streets such as Azusa Avenue and additional inspection procedures help alleviate the problem?

Mr. SHERRILL. I don't have all the facts and backgrounds relating to that. I would say on a personal note that controlling speed is certainly important. I would say a capability of citing spillers on negligent operations is also important. If it is not done right and it costs more to spill it than it does to do it right, they are not going to spill so much. I think most of the transporting companies, with all the notoriety relating to hazardous materials are starting to improve their systems, but I think we still have a ways to go. I think the CHP or the West Covina Police Department would have more information relating to the specific vehicles being used.

Mr. TORRES. Thank you.

Mr. SKELTON. Without objection, I offer the photograph that the chief has presented to the committee of the Hazardous Materials Squad for the record and it will be so entered.

[The photograph presented by Mr. Sherrill follows:]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Mr. SKELTON. Dr. Simpson.

Dr. SIMPSON. I have a question concerning all this protective garb that is illustrated in the picture here. How do you know what level of protection to put your men in when they respond to an emergency?

Mr. SHERRILL. Like I indicated before, the captain has 800 hours of training and we have gone through this at great length. If it is considered to be hazardous through a TLV sniffer, we get a reading which indicates flammability and toxicity, then they will go to a dual suit function. If it is unknown, they will go to a class A function to assure the man minimum exposure with maximum protection.

I think there is one thing that should be made clear is that response to hazardous materials is a very new field and the county of Los Angeles Fire Department has led the way in some operational procedures that we believe will prove effective not only for the county of Los Angeles, but throughout the State and the Nation. We are doing some quite unique things relating to our capability to not only handling that stuff, but to decontaminate people and our own personnel when involved.

Dr. SIMPSON. Can you or do you respond to requests for help on the BKK landfill site itself?

Mr. SHERRILL. We have not responded to any requests onto the BKK facility, I believe one spill in front of it.

Dr. SIMPSON. Would you be able to go onsite in response?

Mr. SHERRILL. Certainly.

Dr. SIMPSON. I see. The manifests that are carried on board the trucks give some information as to what is being transported. Is there any problem with the detail of the information on the manifest? In some cases they read things like solids, water and crude oil. Is that enough for you or would you like to know more than that?

Mr. SHERRILL. Personally, I would like to be assured that every time I looked at a manifest, it was totally accurate. When you deal with hazardous waste, many times a manifest is a conglomerate of chemicals that are emissible and, consequently, you don't have a true idea of the degree of each chemical on the unit—I mean, carried in the vehicle, even though the manifest says that. Realize that when you are in emergency condition, you can't make a mistake initially. We have to protect ourselves for the worst that is carried.

Dr. SIMPSON. But it probably would be helpful if the manifests were more specific.

Mr. SHERRILL. Certainly. The more information you have the better.

Dr. SIMPSON. I was in Baltimore attending a conference not long ago and the interesting fact was presented that for some reason milk trucks, large milk trucks which carry the same volume as a lot of these hazardous waste trucks never seem to spill and never seem to get into accidents, but hazardous waste trucks do. Is that the experience around here, too? The hazardous waste trucks seem to have a disproportionately high number of spills and accidents as compared to something like a milk truck.

Mr. **Sherrill**. I would say probably the CHP would have that information better than I.

Voice. One or two a day.

Mr. **Sherrill**. I was going to say the vehicles themselves are made differently and have different requirements and I think, because of the valving, different types of baffling in the units, they are more susceptible. If you only have one valve to turn off and it flows out of the bottom of the tank, you are going to have it turned off, such as in your car. But when you have four or five valves, sometimes due to traffic conditions, hills, et cetera, you may have a problem.

Dr. **Simpson**. OK. Thank you.

Mr. **Skelton**. You may be interested in knowing that I just received information that there has been a toxic spill on Azusa Avenue. It has been shut down. I am sending two members of our staff down there right now.

Any further questions of the chief? You may be needed, Chief.

Voice. Congressman, may I ask him a short question?

Mr. **Skelton**. No, I am sorry. We can't do that. We must proceed according to regular order.

If there are no further questions of the chief, which we appreciate you being with us, Chief, I will ask if a Mr. Barbosa is present. I think he is.

Mr. **Sherrill**. Mr. Skelton?

Mr. **Skelton**. Yes, Chief.

Mr. **Sherrill**. Could I elaborate on Congressman Torres' request for the Federal Government?

Mr. **Skelton**. Please do.

Mr. **Sherrill**. I think that the county of Los Angeles in one item needs support from its Congressmen in dealing with Superfund items and the magnitude of the problem within the county of Los Angeles as compared throughout the State and the Nation. I think that is a general statement and I think it is general enough to get the point across. Thank you, Congressman. Thank you, Mr. Skelton.

Mr. **Skelton**. Thank you so much, Chief. We really appreciate your being with us. You may want to go down and oversee what our staff is looking at.

Please ask him to step forward. Mr. Barbosa, please have a seat. Thank you for being with us here. Tell us your name and for whom do you work, sir.

TESTIMONY OF HENRY BARBOSA, ATTORNEY, GREATER LOS ANGELES SOLID WASTE MANAGEMENT ASSOCIATION

Mr. **Barbosa**. Thank you. My name is Henry S. Barbosa. I am an attorney for the Greater Los Angeles Solid Wastes Management Association.

Mr. **Skelton**. We appreciate your being with us. Proceed.

Mr. **Barbosa**. Well, I did——

Mr. **Skelton**. We have a copy of your submitted testimony. Maybe you would like to summarize?

Mr. **Barbosa**. Well, basically I represent an association of approximately 100 to 120 small, family-owned refuse haulers who utilize landfills throughout Los Angeles County. My clients are not transporters of hazardous waste, although some of our members do utilize the BKK landfill for the disposal of refuse which they collect in their communities.

In summary, we do support the continued operation of the BKK facility because our clients depend on that landfill, besides the others in the county to dispose of their wastes.

That is the end of my statement.

[Mr. Barbosa's prepared statement follows:]

PREPARED STATEMENT OF HENRY BARBOSA, ATTORNEY, GREATER LOS ANGELES SOLID WASTE MANAGEMENT ASSOCIATION

On behalf of the Greater Los Angeles Solid Wastes Management Association (GLASWMA), let me begin by thanking you and the Subcommittee on Energy, Environment and Safety for the invitation and opportunity to come before your committee, June 3, 1983.

GLASWMA is a non-profit trade association composed primarily of small-to-medium, family-owned and operated companies engaged in the hauling of refuse and solid waste. GLASWMA is proud of its more than 45 year history as a clearinghouse for information on the solid waste industry to state and local governments and appreciates the opportunity to assist this Subcommittee.

The members of GLASWMA are not directly engaged in the business of transporting or handling hazardous waste, but limit themselves to solid waste. For this reason, we deem it inappropriate to comment on such matters as the transportation of hazardous wastes as it relates to any landfill in the area.

However, the BKK landfill is utilized by many members of GLASWMA and we are satisfied that it is an exceptionally well-run facility, and necessary to allowing our members to efficiently and competitively serve their own customers.

In summary, we fully support the continued operation of the BKK landfill.

Mr. **SKELTON**. We appreciate your testimony and your testimony in full will be submitted and made a part of the record without objection.

Congressman Torres.

Mr. **TORRES**. Thank you, Mr. Chairman.

Thank you, Mr. Barbosa, for coming forth today and enlightening us about the function of your organization.

I gather you heard the news that a little while ago there was a spill once again on Azusa Avenue. This situation leads me to ask the following question.

Does the organization that you represent deal in the aspect of training their drivers to be able to follow guidelines relative to speed, inspections, which in some way assist in impeding the kind of problem that just took place, or has been taking place in the recent past?

Mr. **BARBOSA**. Well, the companies that employ the drivers for these refuse trucks, they collect at residences, they collect at apartments. We have a safety program for not backing up the traditional kinds of things that haulers are confronted with, but beyond what the legal code provides or requires of any driver on the road, there is no exceptional training to deal with these other problems that our people are trained for. They just collect the trash in homes and apartments and dispose of it at the landfills.

Mr. **TORRES**. You indicate the collection of refuse. You are not talking about hazardous waste. You are not talking about toxic waste?

Mr. **BARBOSA**. That is correct. I am talking about——

Mr. **TORRES**. This is strictly municipal trash.

Mr. BARBOSA. Yes, from homes and apartments.

Mr. TORRES. Thank you, Mr. Chairman.

Mr. SKELTON. Thank you so much, sir.

Mr. BARBOSA. Thank you, Mr. Chairman.

Mr. SKELTON. Next is a panel of representatives from businesses in the area. I will ask these folks to please step forward: Paul Nares, Jerry Korkotsakis, Dagmar Moreno, Dennis Brown, Anthony Verdin, Nassar Moghadan, Tino Gallindo, Wesley Davis, and Joel Carnarius. Will those folks please step forward? You may have to pull another chair up there, please.

The committee wishes to thank each of you for being with us and appearing with us today. We are, as you know, under a time constraint and I will ask each of you to give us a short presentation and then we will open the panel up for questions. We will start with Mr. Carnarius. Now if I mispronounce your name, you will have to overlook it.

PANEL CONSISTING OF JOEL CARNARIUS; WESLEY DAVIS; DENNIS BROWN; TINO GALLINDO; ANTHONY VERDIN; AND STEVE FROHLING

TESTIMONY OF JOEL CARNARIUS, MANAGER, RADIO SHACK, WEST COVINA, CALIF.

Mr. CARNARIUS. My name is Joel Carnarius and I am the manager of the Radio Shack on South Azusa. I reside directly behind the Carl's Jr. Restaurant. I brought with me some figures comparing one of our other stores that resides at Hacienda and Francisquito to our store as far as sales compared to a normal everyday event and then when there is a spill involving BKK.

Our average month compared to theirs in March was 86 percent of what their store was. On March 28, 1983, when there was a spill, we did approximately 40 percent of what their sales were. On April 4, 1983, we did 41 percent of the sales. On May 18, we did 26 percent of their sales. Overall, we ended up doing 36 percent of what they do when we normally, our months average approximately 88 percent of what that particular store does. As far as with the police coming out, you have less patrol throughout the city because West Covina is a fairly large community. They have to employ about six to eight extra cars, which increases the labor expenditures on the police department.

Being involved with electronics constantly, we do sell scanners and every time there is a spill and on several other occasions, we leave it on because we won't find out what is the spill consisting of. So we are constantly listening in. We do tend to find out over the radio what is going on, and that is basically it.

Mr. SKELTON. Thank you, sir. Mr. Davis.

TESTIMONY OF WESLEY DAVIS, MANAGER, CARL'S JR. RESTAURANT, WEST COVINA, CALIF.

Mr. DAVIS. Thank you. My name is Wesley Davis and I am the restaurant manager of Carl's Jr. located on Azusa and Amar. My business is the last business before the BKK dump.

On days when these spills occur, on an average, we lost 15.38 percent of what we normally do on that day.

Mr. SKELTON. Say that again.

Mr. DAVIS. 15.38 percent less sales on days when spills occur than days when they don't.

We lose anywhere from $75 to $100 on labor alone. As today, right now, with the spill occurring right now, on Friday, Friday is my busiest day. I have the maximum amount of employees on. They all start around 12. They have to work by State law a minimum of 2 hours. I will have to pay them for two hours of work, even though there will be no sales.

When a spill occurs, they block off the road. Depending on where the spill is, if it is close to BKK or Azusa and Amar, they will block off every entrance to that shopping center. There is no way for anybody to get in. Me, myself, and I have experienced times when coming to work, I have had to reroute, I have had to go back, back completely around about 5 miles out of my way.

Mr. SKELTON. Any spill would affect you because of where you are?

Mr. DAVIS. Yeah. But they never call us. They never let us know. Like Joe says, he has a scanner on. He will let me know when a spill occurs. So, if some of the employees have not got to work yet, I will try to notify them not to come in. If they do not come, I do not have to pay them.

But generally the spill occurs when they are already there and I have to pay them.

There is a Carl's Jr. Restaurant located in Rowland Heights that has the same seating capacity and square footage as my restaurant. On an average, we do 89 percent less sales than they do. That could be because we are located in a lower income area, but I feel that it has something to do with the landfill, the toxic materials.

I have had guests complain of the odors, especially at night, coming in through our vents. I have talked with some of the members of our company about getting some kind of venting system to kind of clean this air up as it comes in. We can't really figure out anything to do as of yet.

I have had guests make comments about "Let me have a toxic burger." I am serious. This has happened. I have talked to many of the guests about how they feel about it. A lot of them are afraid to come in. They don't know if the water is contaminated, if our food might be contaminated.

There is no problem with that at all. We have regular inspections by our company for these types of problems.

Me, myself, I just feel that we are not doing nothing to hurt them as far as their business is concerned, but every time a spill occurs, it effects us, the small businesses in the area. I would like to see some tighter restrictions, maybe fining the companies involved, so as to where we could get some kind of compensation for what we are losing. It is not our fault if they have a spill. It is not our fault that they do not care enough to check their trucks before they start driving.

Most of the spills, I would say on the average, occur on Mondays and Fridays. You have heard the joke about don't buy a car that was made on a Friday or a Monday because people are generally in a hurry to get home or don't want to come to work after a week-end. That is when it generally happens. I am wondering if this is the same reason. They seem to be really careless on these days.

Basically, I don't feel that we should have to pay for it. That is all I have to say.

Mr. **Skelton**. Thank you, Mr. Davis.

Mr. Brown.

TESTIMONY OF DENNIS BROWN, MARIE CALLENDAR RESTAURANT, WEST COVINA, CALIF.

Mr. **Brown**. Well, my main concern right now——

Mr. **Skelton**. First, give us your full name and where you work.

Mr. **Brown**. Dennis Brown, from Marie Callendar's.

Mr. **Skelton**. That is a restaurant?

Mr. **Brown**. A restaurant on Azusa Avenue.

One concern is we have not been furnished an evacuation plan at our store. A white cloud appears out over BKK and moves our direction, what are we to do with our employees. The street is blocked off. There is no evacuation plan. I would like to see that be presented to us in some way.

The truck speed in that direction, I understand, is 25 mph and you can stand on that zone and you can see the trucks coming down that downgrade faster than 25 miles an hour. I would like to see that enforced.

I know it is a State problem, but I would like to see more funding coming into the city to enforce tighter controls on these trucks carrying waste to eliminate spill potentials.

The thing that seems to be hurting us the most is the downtime during a spill. We have waited an average of 4 hours to be shut down. I don't understand why if this is a toxic waste dump, we have to wait for cleanup crews to come from Wilmington. Friday afternoon, busy traffic hours and additional time to come in and do the cleanup. I understand now, listening to Mr. Kazarian, that they have purchased the necessary equipment to clean up these toxic spills, but I think that goes further, is to be more controls put on the trucking industry bringing these spills. We should eliminate the amount of spills happening. The past, I think eight of them, according to the chief there, that they responded to since August 1982.

Also, I think it is a concern of the city and the county the amount of tax revenue that is lost during that time because of sales that we lose and going back to May 1981, according to our sales, doing a comparison, we are looking at close to $6,000 that we have lost during spill shutdown time in the restaurant.

So, the main thing I am concerned with and I would like to see is that there are tighter controls on the trucking industry moving through that to eliminate the amount of spills. You did mention about a letter earlier from a concerned citizen about the hazardous wastes and the trucking in the area. We have had a lot of customers coming in making the same comments. They are very concerned about that, especially with their children coming into the center and the market and Thrifty's and into the restaurant.

We are really concerned about the growth potential of our restaurant now. Is the growth of the area going to slow down because of the dump being in the area and we don't have any controls on what is being put in there.

Thank you.

Mr. SKELTON. Thank you so much.

Mr. Gallindo.

TESTIMONY OF TINO GALLINDO, OWNER, VALINDA FURNITURE LIQUIDATORS, VALINDA, CALIF.

Mr. GALLINDO. I am the owner of Valinda Furniture Liquidators and we opened our store October 16. We had announced a pregrand opening and being my first time in business, I spend my money, but we had made arrangements and I went out and bought merchandise from different manufacturers and they were to be delivered to us. Well, the first delivery, besides the merchandise that I had, had to be rerouted. The spill happened in front of our store.

We had to wait a week to get rescheduling from the manufacturers to receive our goods. We have a grand opening going. We are advertising. A second spill. Our trucks did not go in.

So, a lot of problems we have had is we had to run back out——

Mr. SKELTON. How many spills have you experienced?

Mr. GALLINDO. I have had seven in 7 months and today makes eight and they have all been in front of my store, every one.

Anyways, my wife works with me and my father-in-law. We are open from 10 to 9 every night. Well, the first spill I had to walk two blocks up to the store. Everybody is in the store. We are closed. We can't do any business and we just opened up. A week later, we can't do business again and if you notice, from October 27 to December 20, we have had five spills. Our taxes that we were able to report for the month of November and December was only $8,000. That is nothing for what we should be doing. We should be doing maybe $19,000 to $20,000 a month in sales.

After January, our sales have gone back up to the $18,000 or $19,000, but our recognition that we are getting from our customers is, you know, what is the business. All they know us by is the BKK dump basically.

Another thing that happened is in the most recent spill; it happened in front of St. Martha's Church. We are across the street. We became the parking lot for the parents to go get their children, where I am trying to run a business and I can't even use my own parking lot. I think that also is a very bad problem.

Another thing, going down Azusa, I do not see a sign posted on the speed limit or a sign stating that we have children. Slow down your speed because there is children in an elementary school, straight across the street from us. This has been the problem.

There was also an inspection going on one day. After the inspection ended about 30 minutes later, they had a spill. Beyond that, I just don't know what to say any more. I have to close down once a month just for the spills and I am losing money straight out. I lose customers. They don't want to stop. I have two entrances to my parking lot, but everybody is coming down Azusa at 50, 55, 60. Who knows? Sometimes I have to pass my own store, make a turn around and come back to get into my own parking lot because the speed behind me is so fast.

Thank you.

Mr. **Skelton**. Thank you so much.

Mr. Verdin.

TESTIMONY OF ANTHONY VERDIN, OWNER, TONY VEE'S HAIR DESIGN, CITY OF INDUSTRY, CALIF.

Mr. **Verdin**. Yes. I am Anthony Verdin. I am the owner of Tony Vee's Hair Design. I am located on Temple and Azusa. I have been there 2 years and I have experienced most of the spills from the chemical trucks and what I have to say about this is every time there is a spill in my area, the majority of the spills are on Temple and Azusa and the reason is because of the downgrade when the trucks are trying to beat the light.

What happens is my business gets shut down because the sheriff or the police officers, they close down the flow of traffic and that means I will lose business. My customers cannot get into my salon.

Mr. **Skelton**. Do most of your customers have appointments?

Mr. **Verdin**. Yes, they do. I operate just on appointments only and when they stop the flow of traffic, what happens is the sheriff does not, or the highway patrol does not, let any of my customers into the area and I have to shut down for the day.

One instance on October 27, 1982, my salon was used as a command post for the county sheriff of Los Angeles and the West Covina Police Department. I received a thank you letter expressing gratitude for using my salon as a command post, but I lost over $500 that day.

Every time there is a spill, the county sheriff—they already know my salon very well—comes on in and says "Hi, Tony, can we use the phone?" Well, what can I say. I have nothing else to do but let them use the phone because I cannot let any business in.

Once in awhile the county sheriff gets very upset and I hear him gripe and they say what can we do. We have to send your customers away. We cannot let anyone in the area. What happens, I usually talk to them and they always tell me, when is it going to be cleared up and they say it takes an hour before the chemical team comes down and then it takes another couple of hours before they figure out what the spill is. By then, I have lost 4 or 5 hours of business.

Usually, what happens is, I have been there since 1981 and I have experienced the majority of spills in the area. What happens then is I just have to take a loss on it. I am self-employed. I take appointments. My customers cannot come in. Once in a while I get harassed by the highway patrol.

Reason why, one day I was coming to work. I usually come in at 1 p.m. The spills usually happen around 11 o'clock and when I come to work, I have to fight with the highway patrol or the sheriff. I have to get off my truck or park two blocks away just to come on in and tell them, hey, I am the owner of Tony Vee's. I need to get in my business. Sorry, we can't. So, I have to walk to my salon just to call all my customers up and reschedule my appointments.

I have a 5-year lease on that location. As soon as my lease is up, which is I have 3 years left, I will relocate, regardless of what happens in this committee today. I feel that there will still be spills in that area because those truck drivers do not follow the rules of the speed limit.

I am right in front of Azusa and I see them trucks come down that downgrade and regardless of their putting a sign "Trucks use slower lanes, and go 25 miles an hour." They don't obey that law. The only time they obey the law is when they see the county sheriff or highway patrol in presence. Other than that, they will try to beat that light.

That is all I have to say.

Mr. **Skelton**. Mr. Verdin, thank you.

The next gentleman I don't believe we have your name, sir.

Mr. **Frohling**. Yes. My name is Steve Frohling and I am the owner of McDonald's at Amar and Azusa.

Mr. **Skelton**. I apologize. That is along with Dagmar Moreno.

Mr. **Frohling**. With Dagmar Moreno. She is the supervisor of that store.

Mr. **Skelton**. Yes, please.

TESTIMONY OF STEVE FROHLING, OWNER, McDONALD'S RESTAURANT, WEST COVINA, CALIF., ACCOMPANIED BY DAGMAR MORENO, SUPERVISOR

Mr. **Frohling**. I am going to read most of this so I don't overlook some of these points. We opened on December 31, 1982. So, we don't have a lot of experience, thank God, as far as these incidents. But one in particular I want to bring up.

On April 4, 1983, a truck going to the BKK on Azusa was involved in a toxic spill, which caused a total closure of Azusa. I think that was from about 7 to 8 hours. It ran from 10 a.m. to 5 or 6 p.m., which we can't really verify because nobody ever tells us anything.

The closure of Azusa not only caused us loss of daytime sales, over 32 percent that day, which we can document. We have all those figures, but this problem not only cost us dollar sales, but also cost us substantial employee labor dollars because these people were scheduled. We didn't know that the street was closed. We didn't know when it was going to reopen. We didn't want to send people home and then have it reopen and then get hit and give poor service.

We could have done the same business that we did that particular day with 30 percent less employee dollars spent and that probably ran us about $100 or $150.

More important than that single day problem is the lasting effects that the incident may have on our customers that usually travel Azusa on a regular basis. We have found in the past that if people are greatly inconvenienced in their normal traffic patterns, that they will change their patterns to minimize similar problems in the future. Now this long-term effect cannot be measured, but I am sure it is a real factor, especially when you consider the nature of the problem, when it is a toxic waste and contamination problem and people are very aware of the toxic problem there.

I really would have no objection to the dump being there. I don't like the idea of the landfill being there, but I would have fewer objections to it if it didn't have the toxic chemical aspect to it and the contamination. I feel that people may already be avoiding eating in our restaurant and other restaurants in the area simply because of the proximity to this landfill.

I personally would like answers to the following questions and these are questions that really concern me.

What was spilled and what is normally spilled?

What was the danger to the people in the immediate area and should we have evacuated the area?

Why weren't we notified of this danger if there was a danger and why does it take so long for them to clean up? Some of these questions were answered earlier and I kind of understand now about why it takes so long to clean up, which I think is ridiculous to have to call people from Wilmington when this happens on a monthly basis or even more frequently sometimes.

Was there a danger that day of contamination of our foodstuffs and also of our employees and their health?

What are the dangers of contamination on normal days without such incidents? Is this being measured? I hear that sometimes it is, but is it really being looked into, too?

Why are trucks allowed to drive on Azusa Avenue in excess of 40 to 50 miles an hour, which seems to be the big complaint here? These guys are clipping on down Azusa after they have unloaded this stuff, they are going 50 to 60 miles an hour and they are not always in the right lane. They are in every lane. I have seen people try to pull into our parking lot with one of these guys barreling down their rear end of their car and they will drive on. They won't stop, because you look in your rearview mirror and you see one of these giant trucks coming and you are scared to death.

Why was St. Martha's school evacuated twice and why weren't we notified, because they are pretty close to us and if they are going to be evacuated, I would assume there is a problem for us, too. But we never hear anything about those things.

Also, what are the chances of getting these toxic wastes in our water supply? Are they there now?

How safe are these trucks mechanically? Are their brakes checked regularly? Is there a program for that? By the looks of some of these trucks, they aren't checked. I don't think they have been checked since they have been sold and driven out the door. I mean, they are a wreck.

Are the drivers of these trucks licensed to drive these types of vehicles? Some of these guys look pretty questionable.

I would like to sum it up, we certainly hope and pray that it won't take a fatality or loss of an entire family on Azusa going to and from my restaurant or somebody elses, caused by one of these high-speed and poorly maintained trucks. I hope it won't take that to get the BKK landfill here closed or more tightly regulated.

Some suggestions would be, as some of the other fellows mentioned, reducing speeds and then monitoring the heck out of it. I mean, if they put up a patrol car out there with radar, the tickets he would issue would pay for him being out there and then some and make the city a few bucks. I am sure.

Fine them; really fine them. You know, if you hit somebody in the pocketbook, it gets their attention and if you fine these people for these violations of the spills and also speed violations—and I think it would—I don't know if it is legal or not to fine them more than you would an automobile, but the consequences of a truck slamming into a car at those speeds versus another small car slamming into another car is. The consequences are far greater with the trucks.

I would like to see the elimination of the toxic waste dumping altogether and that pretty well sums it up.

Thank you.

[Mr. Frohling and Ms. Moreno's joint prepared statement follows:]

JOINT PREPARED STATEMENT OF STEVE FROHLING AND DAGMAR MORENO, MCDONALD'S RESTAURANT, WEST COVINA, CALIF.

On April 4, 1983, a truck going to the BKK Landfill on Azusa Avenue was involved in a toxic waste spill, which caused a total closure of Azusa Avenue for approximately 7 or 8 hours, from 10:00 a.m. until 5:00 or 6:00 p.m.

This closure of Azusa Avenue caused our store a loss of daytime sales of over 32%. This problem not only cost us dollar sales, but also cost us substantial employee labor dollars, as we were never told of the problem and had no idea of when the problem would be corrected. Consequently, we kept all scheduled employees working, whereas we could have handled that day's business with 30% less employee labor.

More important than that single day's problem is the lasting effects that incident may have on our customers that usually travel Azusa on a regular basis. We have found that when people are greatly inconvenienced in their normal traffic patterns that they will change their patterns to minimize similar problems in the future. This long term effect cannot be measured, but I'm sure is a real factor, especially when you consider the nature of the problem—toxic waste and contamination. People may already be avoiding eating at our restaurant or others in the area due to the proximity of this landfill.

We would like answers to the following questions:

1. What was spilled?
2. What was the danger to people in the immediate area and should we have evacuated the area?
3. Why weren't we notified of this danger?
4. Why does it take so long to clean up?
5. Is it true that the clean-up crews come all the way from Wilmington and if so, why?
6. Was there a danger that day of contamination of our foodstuffs? Our employees?
7. What are the dangers of contamination on normal days without such incidents?
8. Why are trucks allowed to drive Azusa Avenue in excess of 40 and 50 miles per hour?
9. Why was St. Martha's School evacuated twice, when we were not even notified?
10. What are the chances of getting these toxic wastes in our water supply? Are they there now?
11. How safe are these trucks mechanically? Are their brakes checked regularly?
12. Are the drivers of these trucks licensed to drive these types of vehicles?

We certainly hope and pray that it won't take a fatality or loss of an entire family on Azusa Avenue, caused by one of these high-speed and poorly maintained trucks to get the BKK Landfill closed or more tightly regulated.

Mr. SKELTON. Fine, thank you. Ms. Moreno.

Ms. MORENO. We did this together.

Mr. SKELTON. You concur with Mr. Frohling then. Thank you so much for your being with us.

Congressman Torres.

Mr. TORRES. Well, more of a general statement than a question to any one of the particular panelists. I want to thank you very much for taking time from your busy schedules, your businesses, it is money to you, and come before us to let us know directly the problems that beset you.

Some of you I recognize, because in my initial survey of the area I remember going to you and discussing this problem with Mr. Davis, Ms. Moreno. Mr. Frohling, we asked some of those same questions that you asked. That is why we are here today to really look into this issue, not only from the small business community, but the BKK landfill people, how can they begin to look at this question in a clear right, from residents, from the regulatory agencies that have an interest and have jurisdictions over this particular issue.

So, we are really searching. We want to assure you that you are the basis for our being here. We are Federal legislators. We want to see how we can begin to enact legislation that is going to prevent the kind of exodus that Mr. Verdin has mentioned. He is concerned. He knows that when his lease is up, he is leaving. We want to prevent that kind of exodus from the area. It is not in the best economic interest of this community and to that degree we want to be able to do something about it.

I very much appreciate your taking time and being here with us. We know your comments will be of great value. I know that the Chairman will join with me in saying that this is the most important aspect of our hearing today and I want to thank you.

Mr. SKELTON. Thank you, Mr. Torres. You are the reason we are here. This is our prime purpose. Hopefully, there are other areas of information we will glean from this, but when we have problems such as yours, I know you are just a representative sample of some 255 businesses that are along the Azusa Avenue and this can be reflected on other Azusa's in other parts of our country. This can amount to a great deal of money in 1 day of shutdown.

We can see that we have had a recession. I don't know you felt in this particular area. Back home in Missouri, we have had in the small business community, a real tough year and were this same thing to happen back home to some of our small businesses that have been going through the throes of making ends meet, they just wouldn't make it. I hope that some positive thoughts can come out of all of this.

Recognizing the problem is always the first thing. You have helped us do that. We do appreciate your being with us very, very much.

Any further questions of this panel? Yes, Dr. Simpson.

Dr. SIMPSON. I have just one question that anybody on the panel can answer.

Mr. Davis talked about some of his customers complaining about odors, especially at night. Do any of you or your customers have complaints about odors, as well?

Mr. FROHLING. We have odors that are more noticeable outside. I don't know if it is our air conditioning or what, but we have a pretty good system that seems to buffer most of that problem, but outside it is real noticeable. I am sure that people that are coming in with big appetites, by the time they hit the door, I am sure they are less than that at the time when they order.

Dr. SIMPSON. Do you notice it mostly at night?

Mr. FROHLING. Evening, most of the time, and depending on how the wind blows, too.

Mr. GALLINDO. May I say something?

Mr. **Skelton**. Sure. Go right ahead.

Mr. **Gallindo**. Just in regard to the odor, I live near there also, so at night if we go outside, we can smell it.

Mr. **Skelton**. We heard testimony on two different occasions. One about a dark cloud and one about a light cloud. Does that make any sense to any of you? Do any of you see any clouds over the BKK? Mr. Gallindo.

Mr. **Gallindo**. I think the dark cloud is probably what they are referring to when the tractors and bulldozers are working up there. You have that fume. I have seen that, but I think that is all that is. I can't say beyond that.

Mr. **Frohling**. Can I say one other thing?

Mr. **Skelton**. Yes, sir.

Mr. **Frohling**. One problem that we have and it is a constant problem, and I am sure some of the other fellows have this, too, is, if these trucks are not spilling chemicals, they are spilling dirt and crud, and you name it. You know, we have had boulders fall off the trucks in front of our place and on the other side of the street and the guys get out and sometimes they leave them and sometimes they pick them up. But the dirt and just the dust and the crud that is dropped on the highway and then blown into our places makes it a real problem, a continuous maintenance problem, to keep that cleaned up and more so than usual. We have other stores that we operate and this is one of the hardest ones to keep clean, I think, basically because of this, and we have some stores that have got large areas of vacant land around it that have more tendency to be dirty, because of the dirt and everything, but this one, I wouldn't expect it, but I think it is a direct result of these trucks dropping to and from the landfill.

Mr. **Skelton**. Yes, sir. Mr. Davis.

Mr. **Davis**. I would just like to make a couple of comments. First of all, not many residents in the area have what you would call a backyard barbecue, not at night. The smell is that bad. We have had times when we have called the city trying to complain about these things when a spill occurs by getting money back. They have laughed at us. We have all expressed concern with how much money we are losing on these days, but to have officials laugh at us when we ask them what can we do. We would like to see something done.

Mr. **Skelton**. Ladies and gentlemen, thank you.

We will go to the next group, which will be a panel of the West Covina Chamber of Commerce and the Los Angeles Chamber of Commerce. As each of you testifies, and I will ask each of you to give a brief summary, give us your name, the Chamber of Commerce that you represent and your line of business. I will start with Mrs. Palmer.

PANEL CONSISTING OF DIANA PALMER, STEVEN A. BROILES, FRED BURKHARDT, AND STEVEN J. HAMILTON

TESTIMONY OF DIANA PALMER, EXECUTIVE DIRECTOR OF DEVELOPMENT AND ENVIRONMENTAL COUNCIL, LOS ANGELES AREA CHAMBER OF COMMERCE

Ms. **Palmer**. My name is Diana Palmer. I am executive director of Development and Environmental Council of the Los Angeles Area Chamber of Commerce.

Mr. **Skelton**. Do you have a statement, Ms. Palmer?

Ms. **Palmer**. No; I don't.

Mr. **Skelton**. Mr. Broiles.

Mr. **Broiles**. My name is Steven A. Broiles. I am an attorney with the law firm of Richards, Watson, Dreyfuss & Gershon. I am here giving a presentation on behalf of the Los Angeles Area Chamber of Commerce.

Mr. **Skelton**. Please proceed.

TESTIMONY OF STEVEN A. BROILES, ON BEHALF OF THE LOS ANGELES AREA CHAMBER OF COMMERCE

Mr. **Broiles**. Good afternoon. I am Steven A. Broiles, attorney with the firm of Richards, Watson, Dreyfuss & Gershon. I am here today representing the Los Angeles Area Chamber of Commerce. The chamber draws its membership from over 4,000 large and small businesses in the 5 counties of Los Angeles, Orange, Ventura, Riverside, and San Bernardino.

We are here to urge the committee to examine the impact of a hazardous waste disposal site on small businesses, not only from the perspective of its neighbors, but from the perspective of the small businesses in the entire region that depend upon the availability of a disposal site.

We feel it is imperative to view a problem like the disposal of hazardous waste from a regional perspective, particularly since southern California is responsible for generating most of the hazardous waste in the State and BKK is the region's most convenient and economical hazardous waste disposal site. We urge the committee to look beyond the firms in the immediate vicinity of the BKK landfill because hazardous waste disposal is a regional issue.

We need to consider the negative regional impact on small businesses who generate hazardous waste should the BKK landfill be closed without a substitute landfill sited in the region. The closest hazardous waste disposal sites are over 200 miles away at Casmalia, north of Santa Barbara, and at Kettleman Hills, near Coalinga.

Two significant problems in using distant sites such as these are transportation safety and cost. The risk of accidental spills and other transportation hazards increases with each mile traveled. Costs also rise as much as 3 to 4 times, which can be particularly onerous to small businesses with a narrow profit margin.

This added cost of disposal, passed along to the consumer in the form of higher prices, will make these companies less competitive.

Another serious effect of higher disposal cost is increased illegal dumping. Quoting from a recent report by the Southern California Hazardous Waste Management project:

> The only thing that can be said for certain is that illegal disposal will increase if treatment or disposal facilities are not available at locations convenient to waste producers.
>
> In essence a lack of adequate hazardous waste management facilities or high prices charged at such facilities—combined with imperfect enforcement of applicable laws—will compel society to face the risk of greater illegal disposal, with the consequent damage to public health and the environment.

The chamber deplores midnight dumping and favors strict and fair enforcement of all hazardous waste regulations. We feel that the way to discourage illegal dumping is to have safe, convenient, and economical collection and disposal of hazardous waste from industry and households.

One major way to minimize the burden upon landfills such as BKK is to make sure that a substantial number of alternative waste treatment and transfer facilities are available to small businesses and that they are constructed throughout the region.

California has made it a State policy that by 1984 land disposal of highly toxic wastes will be ended. We suggest that the State's timetable to implement this policy is overly ambitious and that there will always be a need for some landfill disposal of these wastes.

It is clear, however, that alternative waste treatment and technology is rapidly improving, and the cost to landfill these wastes is ever increasing. As a result of these combined forces, high tech facilities are becoming both feasible and cost effective.

These facilities are reducing the volume of hazardous waste generated in the region that presently must be landfilled. Congress ought to make sure that the development and siting of alternative waste treatment facilities that will be available to small businesses is not caught up in a procedural morass that will leave industry holding the bag, a bag full of hazardous wastes with no place to put them.

This concludes my prepared remarks.

Mr. SKELTON. Thank you, Mr. Broiles.

Mr. Burkhardt.

TESTIMONY OF FRED BURKHARDT, ASSISTANT MANAGER, WEST COVINA CHAMBER OF COMMERCE

Mr. BURKHARDT. Thank you. I am Fred Burkhardt, the assistant manager of the West Covina Chamber of Commerce.

The West Covina Chamber of Commerce is made up of approximately 600 members. We represent a membership not only in West Covina, but also areas surrounding the city. Like the Los Angeles Chamber, that has just made its comments, and the businesses in the panel prior to us, we have very similar concerns, very similar interests.

The Chamber of Commerce of West Covina is very much interested in solutions to the problems, not additional studies and not simply carrying on the morass, which has already been mentioned.

Mr. SKELTON. Thank you, sir.

Mr. Hamilton.

TESTIMONY OF STEVEN J. HAMILTON, PRESIDENT, WEST COVINA CHAMBER OF COMMERCE

Mr. HAMILTON. My name is Steven J. Hamilton. I am an attorney. My business is located in the city of West Covina. I am also president of the West Covina Chamber of Commerce and a resident of West Covina.

During the past few years the West Covina Chamber of Commerce has monitored the growing community interest in the BKK landfill. At this point, the business community is being impacted in a manner as yet to be determined, which is in need of more intensive examination. To conduct part of this examination, the West Covina Chamber has appointed its own task force to study and recommend to the chamber's board of directors appropriate mitigating measures for the relief of any possible negative economic impacts that might be generated by the transportation of waste to the facility or the general safety that is needed for the operation of or transportation of hazardous waste to the landfill.

The task force has various areas of concern and purposes. They include the overall economic impact of the landfill operation on the business community. The chamber is concerned about the image of the business community when faced with the issue of transportation of hazardous waste. It is also concerned, of course, with the economic loss in the event of a closure due to a spill like the one that is going on today.

The second area of concern is to look at legislation on the State and Federal level, which affect the ability of local peace and traffic officers to enforce the State of California's hazardous waste transportation laws. The local officials do not have any authority with the enforcement of those particular laws.

What specific measures can be taken to improve the traffic on the routes of ingress and egress to the landfill? Many areas need to be looked at. We need to be concerned about vehicle safety that you heard earlier from the businessmen that testified. We, again, need to increase the authority of the local peace and traffic officers to enforce the hazardous waste transportation laws. We need increased penalties for the unsafe and improperly documented vehicles that are traveling that route to ensure that these vehicles don't create any further problems.

We need to increase the responsibilities and the penalties to the generators of waste. We need to increase the funding to local authorities for more inspection stations so that they will have the financial ability to carry out the charge that they would probably wind up getting.

What opportunities are available to encourage the establishment and licensing of treatment facilities? I believe you heard earlier today about alternate methods of disposal that would involve toxic waste treatment facilities, which would certainly lower the amount of materials coming into our community and lower the traffic with the trucks and that certainly would help to eliminate any of the spills that we have.

We need cleanup procedures that will provide for the public safety and yet minimize the street closure times. I think the businessmen indicated that they have the greatest impact or they feel the greatest impact when we do have a spill and in many cases the spills have been called hazardous or toxic materials, but they have been relatively noncaustic, something along the lines of a lime spill, which shut down Azusa Avenue for 8 or 12 hours. I think that could be sped up to avoid the damages that are occurring to our local businesses.

We need availability of funds to assist the local officials in the enforcement of State and Federal waste transportation laws.

We have submitted to you our testimony, along with a matrix that has our areas of concern, why they are areas of concern, and some possible mitigating measures. We will be available for any questions.

[Mr. Hamilton's prepared statement with charts follows:]

PREPARED STATEMENT OF STEVEN J. HAMILTON, PRESIDENT, WEST COVINA CHAMBER OF COMMERCE

During the past few years, the West Covina Chamber of Commerce has monitored the growing community interest in the B.K.K. Landfill. At this point, the business community is being impacted in a manner, as yet to be determined, which is in need of more intense examination.

To conduct this examination, the West Covina Chamber has appointed a Task Force to study and recommend to the Chamber's Board of Directors appropriate mitigating measures for the relief of any possible negative economic impacts that might be generated by the transportation of waste to the facility or the general safety that is needed for the operation of or transportation of hazardous waste to the landfill.

The taskforce has been charged with several purposes. They are:

1. The over all economic impact of the landfill operation on the business community.

2. Legislation on the state and federal level which effect the ability of local peace and traffic officers to enforce the State of California's hazardous waste transportation laws.

3. What specific measures can be taken to improve the traffic safety on the routes of ingress and egress to the landfill.

What opportunities are available to encourage the establishment and licensing of treatment facilities.

5. Clean-up procedures that will provide for the public safety and yet minimize the street closure times.

6. Availability of funds to assist local officials in the enforcement of State and Federal waste transportation laws.

Attached you will find a matrix showing our areas of concern, the current status and possible mitigating measures which we would recommend for examination and action. We shall be reviewing the same list and making appropriate recommendations to our Board and elected officials.

AREA OF CONCERN	STATUS	POSSIBLE MITIGATING MEASURES
1. Overall economic impact of the landfill operation on the business community.	The increase in the number and frequency of spills has given rise to the realization that an economic impact study must be made to determine the extent of impact that the landfill operation has on the business community relative to: 1. Image 2. Economic loss through closures 3. Economic loss due to shopping environment	1. Funding an economic impact study. 2. Funding an attitude survey for shoppers.
2. Local enforcement of hazardous waste transportation laws.	Increased awareness and concern by the public regarding safe transportation of toxic waste coupled with stepped up regulatory activity by governmental agencies, has caused the use of B.K.K. for toxic waste disposal substantially over the past decade. 493,000 tons (40% +/-) of all toxic waste disposed of in California is transported to the B.K.K. Landfill. The primary route to the landfill is Azusa Avenue. The average daily count of commercial vehicles traveling to the landfill is: Commercial waste-haulers = 750 Toxic and hazardous = 200 TOTAL PER DAY = 950	1. Increase capability of local jurisdictions (local police and enforcement agencies) to enforce hazardous waste transportation laws.

AREA OF CONCERN	STATUS	POSSIBLE MITIGATING MEASURES
3. Increased use of unsafe vehicles in the transportation of hazardous waste.	To date (4/26/83) 126 trucks have been stopped in West Covina and inspected. 92.8% (117) were cited for equipment and/or safety violations. 25.4% (32) were ordered out of service due to the severity of the equipment violation. Of the 329 vehicles cited by the West Covina Police Department to date (4/26/83) another 52 toxic waste haulers were found to be operating without Department of Health Services hazardous waste permits or with improper manifests. These vehicles had to be released without citations because the Vehicle Code does not allow local police agencies to cite for that violation. Yet, if those trucks spills its load (as they have done 16 times in our City since 1981), West Covina's Safety personnel are mandated by law to mitigate the incident and must rely on those same manifests to identify the toxic material to insure its safe and proper disposition. Health and Safety Code Sections 25180 and 25191 (California) limit regulation and enforcement of toxic waste transporters to the Department of Health Services and the California Highway Patrol.	1. Increase the authority of local peace and traffic officers to enforce the State of California's hazardous waste transportation laws. 2. Increase the penalties for unsafe, improperly documented vehicles to a prohibitive level to unsure that it is not cost effective to run such vehicles. 3. Increase the responsibility and penalities to the generators of the waste. 4. Increase the funding to local authorities for more inspection stations. 5. Create the necessary legislation or modification of current regulations permitting the establishment of a 25 MPH dedicated truck lane.

AREA OF CONCERN	STATUS	POSSIBLE MITIGATING MEASURES
4. Decrease the number of truck trips to the site.	See page 1, Status.	1. Facilitate the licensing of toxic waste treatment facilities. 2. Standardize state regulations relative to waste jurisdiction and administration. NOTE: The licensing of the Willmington waste treatment facility would reduce the number of daily trips to B.K.K. by as much as 75%.
5. Unreasonable shutdown and evacuation due to unclear jurisdictions and cleanup procedures.	When spills occur, the availability of standard clean-up procedures and authority is in many cases unclear. This causes undue hardships on both the businesses located at the site of the spill and those citizens living or traveling in the area.	1. Standardization of clean-up procedures and jurisdictions.

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Mr. **Skelton**. Thank you. Without objection, that will be made of the record.

Congressman Torres.

Mr. **Torres**. Thank you, Mr. Chairman. Thank you, Mr. Hamilton, for your presentation. You obviously heard the presentation of the previous group of small businessmen and businesswomen in the area. They had a series of grievances relative to the problem we are talking about today; however, I didn't hear them mention that they belonged to a business group. Were any of the people that participated in the previous panel members of your chamber? The issues you raised as part of your task force's recommendations, I gather, raise many of the problems the previous panelists have experienced. I am wondering whether your chamber is trying to resolve the grievances that they have. Obviously, a chamber can do this, vis-a-vis a city council and the management of a city.

Is BKK a member of your chamber? What degree do you sit down with BKK and its management to try to resolve the very items that you mentioned?

Mr. **Hamilton**. I am informed by Mr. Burkhardt that two of the members that did testify are members of our chamber. Our task force is newly appointed. We have not had any discussions with any other groups or organizations, other than the one that you will hear later today. We did have a meeting with the transition task force members.

The BKK is a member of the chamber, but there has been no formal discussions—well no informal discussions either—in official capacity with the chamber with them over this particular issue. This is new for us. We are starting to investigate it and we are basically at the beginning.

Mr. **Torres**. Thank you.

Mr. **Skelton**. Thank you. Doctor.

Dr. **Simpson**. Mr. Broiles, you made the comment that—I guess it is the association that you are representing—is taking the position that 1984 is an overly ambitious date to set for the phasing out of landfilling. Is that correct?

Mr. **Broiles**. That is correct.

Dr. **Simpson**. On what basis do you make that statement?

Mr. **Broiles**. I think the original assessment made by the Office of Appropriate Technology at the State level did not consider the difficulties in building alternative waste treatment, waste management facilities. It was based primarily on a critique that was done by the consultant, Meredith Boli & Associates.

Dr. **Simpson**. Has the organization you represent done a study to take the contrary position and supported that position?

Ms. **Palmer**. No; we have not made any formal study on our own.

Dr. **Simpson**. OK. Thank you very much.

Mr. **Skelton**. Thank you all very much for being with us today.

I am going to depart from regular procedure and ask Mr. Russell Orban of my staff to take the witness stand.

TESTIMONY OF RUSSELL ORBAN, COUNSEL, SUBCOMMITTEE ON ENERGY, ENVIRONMENT, AND SAFETY ISSUES AFFECTING SMALL BUSINESS, SMALL BUSINESS COMMITTEE, HOUSE OF REPRESENTATIVES

Mr. **Skelton**. Tell us your name, please.

Mr. **Orban**. My name is Russell Orban.

Mr. **Skelton**. Where do you live?

Mr. **Orban**. I live in Washington, D.C.

Mr. **Skelton**. What is your line of work?

Mr. **Orban**. I am the counsel on the Subcommittee on Energy, Environment and Safety Issues Affecting Small Business of the Small Business Committee of the House of Representatives.

Mr. **Skelton**. You are here accompanying the Small Business Subcommittee at this hearing. Is that correct?

Mr. **Orban**. That is correct.

Mr. **Skelton**. A few moments ago a report was received regarding a problem on Azusa Avenue and I requested you and a staff assistant of Mr. Torres to drive down there?

Mr. **Orban**. That is correct.

Mr. **Skelton**. Could you tell us what you found, please?

Mr. **Orban**. We went down to the corner of Temple Avenue and Azusa Avenue, and followed Temple Avenue up through Amar Avenue, and then up to the approach of the BKK landfill.

In the right-hand lane, closest to the curb, a number of cones had been set up.

Mr. **Skelton**. Traffic cones.

Mr. **Orban**. Traffic cones over approximately a three-quarter to a 1 mile area from Temple Avenue to the BKK entrance. At that time we stopped and asked the officers what the problem was. They confirmed that there had been a spill of some substance that dotted that particular lane of highway from Temple Avenue up to the BKK entrance. We observed a powder, probably in its strongest concentration to be, let's say, about saucer size. Most of the concentrations were, perhaps, tennis ball size, spilled at approximately 5 to 10 foot intervals from Temple Avenue to the BKK entrance.

To my untrained eye it did not appear to be extremely critical or pose any immediate danger, but we questioned the officers further.

Mr. **Skelton**. What did you learn, Mr. Orban?

Mr. **Orban**. They had said that due to a complaint of a passerby they had checked out the area. They were responding to the spill and attempting at that time at the BKK headquarters to determine the nature of the material. They had pulled the manifest, which I have a copy of, and were detaining the truck and taking tests.

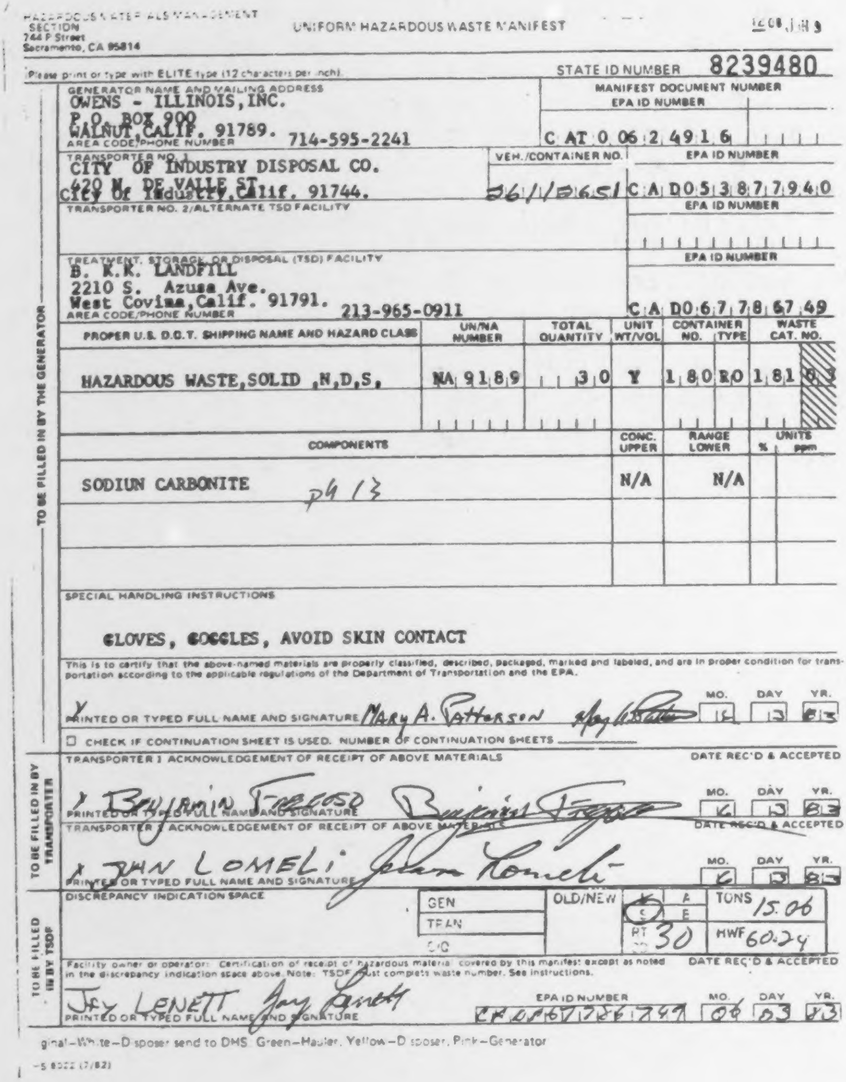
They found that the pH at the truck of the white powdery substance was 13, that the substance was, according to the manifest, sodium carbonate, which as I understand it is a form of baking soda used in some industrial process. However, the truck had its corrosive signs on and since sodium carbonate is not corrosive, they were tracking down the material to see if there was something else in the truck or to see if it had been mixed with some other type of material. Also, the handling instructions of the manifest indicated special handling was necessary such as gloves, goggles, and the caution to avoid skin contact.

They took tests from the powder as they found it on the street. Those showed that in the half hour to 45 minutes since the substance had made contact with the street, its pH level had reduced evidently from a level of 13 to a level of 9, which means that as it was in contact with the concrete, it was dissipating. As we left, they had felt the situation was in hand and were making a determination if they should start a sweeping operation or something to clean it up or if they should just let it dissipate.

Mr. SKELTON. Was there a traffic problem down there?

Mr. ORBAN. There were police cars dotting the right hand lane, but there appeared to me to be plenty of room, I mean if you are in a car, to move over into the left-hand lanes and get around easily. If you wanted to pull into a parking lot on the right side, perhaps, you would have to cut through that police marked lane to do it. That may cause some problem, but I think it would be going too far to say it was a traffic jam or anything like that.

[The manifest of the spill follows:]



HAZARDOUS MATERIALS MANAGEMENT SECTION
744 P Street
Sacramento, CA 95814

UNIFORM HAZARDOUS WASTE MANIFEST

[illegible]

Please print or type with ELITE type (12 characters per inch).

STATE ID NUMBER 8239480

MANIFEST DOCUMENT NUMBER

GENERATOR NAME AND MAILING ADDRESS
OWENS - ILLINOIS, INC.
P.O. BOX 900
WALNUT, CALIF. 91789.
AREA CODE/PHONE NUMBER 714-595-2241
EPA ID NUMBER C AT 0 06 2 49 1 6

TRANSPORTER NO. 1
CITY OF INDUSTRY DISPOSAL CO.
420 N. DE VALLE ST.
City Of Industry, Calif. 91744.
VEH./CONTAINER NO. 261/1651
EPA ID NUMBER C A D 0 5 3 8 7 7 9 4 0

TRANSPORTER NO. 2/ALTERNATE TSD FACILITY
EPA ID NUMBER

TREATMENT, STORAGE, OR DISPOSAL (TSD) FACILITY
B. K.K. LANDFILL
2210 S. Azusa Ave.
West Covina, Calif. 91791.
AREA CODE/PHONE NUMBER 213-965-0911
EPA ID NUMBER C A D 0 6 7 7 8 6 7 4 9

PROPER U.S. D.O.T. SHIPPING NAME AND HAZARD CLASS	UN/NA NUMBER	TOTAL QUANTITY	UNIT WT/VOL	CONTAINER NO.	CONTAINER TYPE	WASTE CAT. NO.
HAZARDOUS WASTE, SOLID, N,D,S,	NA 9189	30	Y	180	RO	181

COMPONENTS	CONC. RANGE UPPER	CONC. RANGE LOWER	UNITS %	UNITS ppm
SODIUN CARBONITE pH 13	N/A	N/A		

SPECIAL HANDLING INSTRUCTIONS

GLOVES, GOGGLES, AVOID SKIN CONTACT

This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation and the EPA.

PRINTED OR TYPED FULL NAME AND SIGNATURE MARY A. PATTERSON — MO. 6 DAY 13 YR. 83

☐ CHECK IF CONTINUATION SHEET IS USED. NUMBER OF CONTINUATION SHEETS ______

TO BE FILLED IN BY THE GENERATOR

TRANSPORTER 1 ACKNOWLEDGEMENT OF RECEIPT OF ABOVE MATERIALS — DATE REC'D & ACCEPTED

PRINTED OR TYPED FULL NAME AND SIGNATURE BENJAMIN FRAGOSO Benjamin Fragoso — MO. 6 DAY 13 YR. 83

TRANSPORTER 2 ACKNOWLEDGEMENT OF RECEIPT OF ABOVE MATERIALS — DATE REC'D & ACCEPTED

PRINTED OR TYPED FULL NAME AND SIGNATURE JHN LOMELI John Lomeli — MO. 6 DAY 13 YR. 83

TO BE FILLED IN BY TRANSPORTER

DISCREPANCY INDICATION SPACE

GEN	OLD/NEW	K	A	TONS 15.06
TRAN		[✓ S]	E	
O/C		RT 30		HWF 60.24

Facility owner or operator: Certification of receipt of hazardous material covered by this manifest except as noted in the discrepancy indication space above. Note: TSDF must complete waste number. See instructions. — DATE REC'D & ACCEPTED

PRINTED OR TYPED FULL NAME AND SIGNATURE JAY LENETT Jay Lenett — EPA ID NUMBER CAD067786749 — MO. 06 DAY 03 YR. 83

TO BE FILLED IN BY TSDF

Original—White—Disposer send to DHS. Green—Hauler, Yellow—Disposer, Pink—Generator

DHS 8022 (7/82)

Mr. **Skelton**. Thank you.

Congressman Torres.

Mr. **Torres**. No questions, Mr. Chairman.

Mr. **Skelton**. Thank you so much.

Mr. **Orban**. Thank you.

Mr. **Skelton**. I would like to ask the next group to appear together as a panel. Father Juan Romero, Gloria Rodriguez, William Whisenhunt, Tom Walsh, and anyone with that group, please.

Am I correct in assuming that the three on my left represent one group and that the three on my right represent another group? Is that correct?

Reverend **Romero**. With some cross fertilization.

Mr. **Skelton**. The four on my right constitute one group and the two on my left constitute another group. Those who are listed first, your group, Father Romero, and I will begin with you.

PANEL CONSISTING OF REV. JUAN ROMERO; GLORIA RODRIGUEZ; ROLLAND BOCETTA; TOM WALSH; AND WILLIAM T. WHISENHUNT

TESTIMONY OF REV. JUAN ROMERO, PASTOR, ST. MARTHA'S CHURCH, LA PUENTE, CALIF.

Reverend **Romero**. Mr. Chairman, Ike Skelton, our local representative, Esteban Torres, and the others I don't believe are present, the other members of the committee. Is that correct? OK.

Welcome and thank you for coming. My name is Rev. Juan Romero. For the last 2 years I have been pastor of St. Martha's Parish, which includes about 3,000 families and covers parts of the areas of La Puente, Belinda, West Covina, City of Industry, Walnut, and county of Los Angeles, unincorporated. I am happy to be with you this afternoon in my parish territory, with many people from St. Martha's. I would like those others of St. Martha's who are here to stand up. Thank you.

With you, we are very concerned about energy, environment and safety.

The Ben K. Kazarian landfill, also known as the BKK toxic waste dump, is very close to our parish school of 340 children. This year trucks bearing hazardous waste—to be sure, some of it toxic and possibly very toxic—have spilled in our front yard 11 times and this afternoon was the 12th. This poses a danger for our schoolchildren, teachers, workers, and volunteers of the parish, as well as the priests and sisters residing in our rectory and convent.

In a spirit of hope, we are this day looking for a way toward a community free from the danger of toxic waste spills. It is normal for Government, private enterprise, and local communities to work for their own interests, but it is now time for us to work together in recognition that we have common interests, energy, environment, and safety.

Poison is bad for anybody. Invisible and odorless poisons are especially dangerous to health and safety of people. It is never morally permissible to harm people with poisonous materials. All parties must cooperate in preventing, not just minimizing such danger, especially in densely populated or residential areas. This is commonsense and a moral imperative.

There are decisions made that increase this danger by increasing the number of poisonous materials being brought into or passing through our local community. This danger is not remote as we have witnessed 12 times this year. Spills on our front yard.

Decisions which allow that to happen need to be challenged. We are doing that. We have done and will continue to do our part. We have been working in cooperation with the appropriate agencies to develop a school evacuation plan in case of toxic spills. We have succeeded in lowering the speed limit for trucks passing in front of our church, school, convent, and rectory in order to reduce incidence of spills.

We, together with Esteban Torres, were successful in obtaining State and Federal funds for truck inspection to insure greater safety. We brought together various police, fire, emergency, and safety agencies of the county of Los Angeles and local municipalities to work out questions of jurisdiction for the safety of our children in event of toxic spills.

We have requested of the city of West Covina, through its city council, to use its influence to reroute truck traffic of hazardous materials to enter BKK from the north. We have begun dialog with BKK leadership to explore avenues of joint action for common good.

Toxic waste should be detoxified on site. If it is to be transported, it should be transported to remote and/or depopulated areas. Government cooperation is necessary for the siting and purchasing of appropriate Federal lands for such deposits.

Gentlemen, we ask you to take this message to Washington and to act upon it. First, to help develop and enforce effective policies and guidelines for the disposal industry, so that the safety of residents will be insured.

The second, final one is to help find and pay for Federal land on which no one is currently living nor on which anyone will live, sites, which may serve as a safe deposit for toxic wastes. To allow toxic waste materials, which pose serious health and safety threats to densely populated areas is intolerable, not to say immoral. Eleven spills we have witnessed over the past year tempts some people to advocate strongly, dump the dump, as the only solution. There are other alternatives, which require the cooperation of the local community, private enterprise, and Government agencies.

Let's look for them. Find them and implement them. We want our wind, water, and Earth clean and our people safe and healthy.

Thank you.

Mr. SKELTON. Thank you, Father.

Sister, I don't believe we have your name, please.

Sister INVENCION. I am Sister Invencion. I am the principal of St. Martha's School and I am here with Father and the group and it is needless to say how upset I am about the whole thing.

Mr. SKELTON. We appreciate your being with us, Sister.

Reverend ROMERO. I might mention the fact that it is a cost to her as principal of the school to take this time out, especially the day before graduation.

Mr. SKELTON. We doubly appreciate your being with us, Sister.

Ms. Rodriguez.

TESTIMONY OF GLORIA RODRIGUEZ, RESIDENT OF WEST COVINA, AND MEMBER, ST. MARTHA'S CHURCH

Ms. RODRIGUEZ. Honorable Members of Congress, my name is Gloria Rodriguez. I am a resident of West Covina and a parish member of St. Martha's, and also a parent of a child who attends St. Martha's School.

My activities at the parish are social concerns chairman and evacuation plan chairman. I would like to discuss with you daily life next to a toxic waste dump.

The children of St. Martha's are affected daily by toxic waste haulers traveling north on Azusa headed for the Ben K. Kazarian toxic waste dump. During the day they walk through chemically laden dust from the tires of BKK tankers. During the rainy season, the children have to wade through streams of water from BKK, whose runoff has been tested and shown to have toxic chemicals. The air that the children breathe has been shown to contain dangerous emissions. To further endanger the children is the ever-present danger of a toxic spill that will take a life.

The children are aware of the trucks and spills. They are fearful. At a West Covina City Council meeting, Tuesday, April 25, 1983, Gloria Aguilar, a student at the school said the spills keep her and her classmates in from lunch and physical education classes. She said a lot of children were worried during the spills. The fears of the children at night worrying about toxic spills is an anxiety situation they are not able to cope with.

Many students attending St. Martha's School live adjacent to the Ben K. Kazarian toxic waste dump. They have to contend with cancer-causing chemicals on a daily basis, at home and school, along with the fears of toxic spills.

The children's education is being disrupted. If a spill occurs, our children are instructed to remain in their classrooms with the doors and windows shut, and air-conditioning off. Parents are then notified to have the choice of picking up their children or leaving them at school until school is dismissed. The heat in the rooms is unbearable. The parents of St. Martha's are tired of hearing, "Oh, it is just lime sludge that has been spilled."

The dangers of exposure to unknown chemicals and their toxicity are generally unknown for hours. The constant spills have exposed the children of St. Martha's to hazards and contaminations not known to children in other areas. Parents have been so concerned about the health and safety of their children, they are seriously thinking of not enrolling their children for the next semester.

Thank you, gentlemen.

[Ms. Rodriguez' prepared statement follows:]

PREPARED STATEMENT OF GLORIA RODRIGUEZ, RESIDENT OF WEST COVINA, AND MEMBER, ST. MARTHA'S CHURCH

Prepared Statement of Gloria Rodriguez, Resident of West Covina, and Member, St. Martha's Church

INTRODUCTION

Involvement of St. Martha's Parents Club Concerning Ben K. Kazarian Toxic Waste Dump

1980 - 1981 Parents become concerned when information was being released by Hearthstone Homeowners Association on the operation of BKK toxic dump.

ACTION - Parish and school supported homeowners group by signing petitions opposing'toxics in the community. Kept informed on action by various homeowners group opposing toxic dump in residential areas. Parents joined groups to help.

1981 - 1983 - Parents became alarmed by toxic spills on the corner of the church and school. There have been 11 spills.

1982 - 1983 This school year alone there has been nine chemical spills outside the school. With this fact, parents wanted action.

ACTION

1. Presentation by Gloria Rodriguez, parent of student attending St. Martha and member of West Covina Homeowners Coalition regarding problems affecting school and community by BKK Toxic Waste Dump.
2. Pastor and Nuns and school staff took stand against toxics.
3. Petition signed by parents and sent to Congressman Esteban Torres to get truck grant to enforce toxic tanker laws.
4. Letters sent to government
5. Parents fought for 25 m.p.h. speed limit and and right lane to be used by toxic tankers enroute to BKK toxic waste dump.

6. Parents met with County, City and State law enforcement and fire departments.
7. Parents working on evacuation plan for school.
8. Parents attend West Covina City Council meeting to voice concerns.
9. Information given to parents weekly regarding BKK problems.
10. Parents on campaign to have tankers rerouted through West Covina via the San Bernardino Freeway rather than through county.
11. Meeting held at school often to keep parents involved and informed.
12. Parents notifying prospective homebuyers of the location of BKK toxic waste dump.
13. Parents attended countywide meeting regarding hazardous waste problems.
14. Parents are involved in daily action concerning toxic waste in community.
15. Parents attend meetings of other groups fighting dumps in Los Angeles County.

SECTION II

DAILY LIFE NEXT TO A TOXIC WASTE DUMP

The children of Saint Martha's are effected daily by toxic waste haulers traveling North on Azusa Avenue headed for the Ben K. Kazarian Toxic Waste Dump. During the day, they walk through chemically-laden dust from the tires of BKK tankers. During the rainy season, the children have to wade through streams of water from BKK, whose runoff has been tested and shown to have toxic chemicals. The air that the children breathe has been shown to contain dangerous emissions. And to further endanger the children is the ever-present danger of a toxic spill that will take a life.

CHILDREN'S FEARS

The children are aware of the trucks and spills - they are fearful. At a West Covina City Council meeting, Tuesday, April 25, 1983, Gloria Aguilar a student at the school said the spills keep her and her classmates in from lunch and physical education classes. "A lot of the kids were worried," she said, during the spills. The fears of children at night, worrying about a toxic spill is an anxiety situation they are not able to cope with. Many students attending Saint Martha's School live adjacent to the Ben K. Kazarian Toxic Waste dump. They have to contend with cancer-causing chemicals on a daily basis, at home and school, along with the fears of toxic spills.

EDUCATIONAL INTERRUPTION

The children's education is being disrupted! If a spill occurs, our children are instructed to remain in their classrooms with the doors and windows shut and air conditioning off. Parents are then notified and have the choice of picking up their children or leaving them at school until school is dismissed. The heat in the rooms is unbearable! The parents of Saint Martha's are tired of hearing, "Oh, it's just lime sludge that has been spilled."

DANGERS OF EXPOSURE TO UNKNOWN CHEMICALS

The unknown chemicals and their toxicity are generally unknown for hours. The constant spills have exposed the children at Saint Martha's to hazards and contaminations not known to children in other areas. Parents have been so concerned about the health and safety of their children, they are seriously thinking of not enrolling their children for the next semester.

ATTACHMENTS

Attached is a copy of an "Analysis of Questionnaire - Written Comments of Community dated April 11, 1983 and Analysis of Questionnaire dated April 11, 1983.

SECTION III

HAS ANY STATE, COUNTY OR LOCAL GOVERNMENTAL AGENCIES PROVIDED ST. MARTHA'S SCHOOL WITH A PLAN FOR EVACUATION OR OUTLINED ACTIONS TO TAKE IN THE EVENT OF A TOXIC SPILL?

ANSWER: No local, state or county governmental agency has come forward with any information dealing with this subject.

One could interpret this as a total lack of concern or there is no agency willing to assume control and responsibility for the protection of the children, teachers, and staff at St. Martha's School complex.

The Ben K. Kazarian Toxic Hazardous disposal site can be easily accessed from the San Bernardino Freeway (I-10) to the North. The route from Interstate 10 to the disposal facility, lies within the city of West Covina, the benefactor of revenues generated by the disposal corporation.

St. Martha's complex is located in the Los Angeles County area; no affiliation with the city of West Covina and receives no financial benefit from the disposal operation. But because of the insistance of the transporters of this material to access the facility from the south, has and continues to expose St. Martha's to toxic spills. The location of our complex has created delays in material identification, hazards and direction from the authorities responsible for the clean-up operations.

To identify one responsible agency has been a monumental task as one agency is reluctant to infringe upon the authority of another governmental agency. We have solicited meetings with the California Highway Patrol, Los Angeles Sheriffs Department, local and county fire departments, the Police Department of West Covina, only to discover no particular agency has been identified as responsible for the health, safety and welfare of our children.

We were forced, by the lack of participation by these agencies, to develop our own limited disaster plan for the protection of our children. Constant toxic spills and demonstrated lack of concern by these agencies, have forced us into this position, even though we are certainly no experts in this field. A copy of our plan is included in this package.

Our school location has directed our concerns to the Los Angeles County arena - the response and concern has been negligible. We are only a small voice in a remote portion of a large county area; therefore our voices are not heard. Also, we believe the problem goes much beyond the immediate concerns of our parents and children.

SECTION IV

CONCLUSIONS

The Ben K. Kazarian Toxic Waste dump in West Covina is a threat to the lives of those involved at St. Martha's. Not only are the parishioners exposed to polluted air, foul odors, undetermined health hazards, chemical spills, but the word "sanitary" is a misnomer if there ever was one. BKK endangers the lives of all its neighbors.

Our children are being exposed involuntarily to vinyl chloride, TCEs, PCBs and other cancer-causing chemicals, in the classrooms and at home. As they walk to school, they are exposed to chemical spills. As they play in the school yard, they are exposed to the exhaust diesel fumes of hundreds of tankers each day passing the school. Our children walk through streets and are contaminated by chemically-laden dust and unknown carcinogens in the air. The children of St. Martha's are exposed in a hundred ways to the dangers from Ben K. Kazarian's toxic waste dump. Childhood should be free from worry and fear...unfortunately, for the children at St. Martha's, that is not so.

Parents at St. Martha's avoid shopping in the area. They have instructed their children not to purchase candy or eat fast foods from local shops for fear of contamination. And everyone understands the need for drinking bottled water.

When one understands our fears, the realization that the fears are real. When one can visually observe the hundreds of tankers traveling the corner of Azusa and Temple, one can truly understand the magnitude of the problem.

The parishioners and concerned parents of St. Martha's have prepared this report to show our concerns for the safety, Welfare and health of our families, members and residents of our community. Because of the following reasons:

1. Removal of local control of toxic waste dumps by SB501
2. Flagrent disregards for safety by chemical waste haulers
3. Inability of state agencies to protect St. Martha's children, teachers and staff,

we need assistance,from the federal government to solve this problem. We can no longer endanger the lives of our children. We need your help.

Mr. SKELTON. Thank you, Ms. Rodriguez.

Mr. Bocetta.

Mr. BOCETTA. Mr. Chairman, I have a two-page prepared statement.

Mr. SKELTON. First, let's have your full name.

TESTIMONY OF ROLLAND BOCETTA, RESIDENT OF WEST COVINA, AND MEMBER, ST. MARTHA'S CHURCH

Mr. BOCETTA. My name is Rolland Bocetta. I am a West Covina resident and a parishioner of St. Martha's Church. I am also a local businessman, because I am self-employed as a CPA, with my office located within 2 miles from the perimeter of the Ben K. Kazarian toxic waste dump.

My home is less than half a mile from the perimeter of the dump. When we bought our house in 1976, nobody told us about the existence of a toxic waste facility in our midst, not the city, not the developers. I was told, though, that there would be a golf course north of Amar, but then after some time the city allowed houses to be built there and now I realize it was just a ploy because the golf course that they were talking about is something that is to be built when the Kazarians have filled in the landfill 20 years from now.

The dump, of course, has been detrimental to my business, my modest practice, in the sense that the hours are spent in the fight against BKK could have been devoted to the planning and development for growth of my modest practice. This is lamentable for me and certainly for those others who have been fighting the dump longer than me.

Now, there are people like Mr. Camarena who are in positions of responsibility in government who do not see the reality of the problem that we have here because they wait for the classical signs, such as high statistical data on destroyed bodies and lives. For those of us who are already here, we see in the language and emotions of innocent school children exposed to the dangers of numerous toxic spills, in the frayed nerves of anxious parents whose daily prayer is that their kids be saved from disaster, in the traumatic experiences of parents who have found that too many governmental agencies are involved, but not one is completely in control, in the fearful realization that residents might have to fend for themselves in case of another spill, simply because no governmental agency cares enough to design and put in readiness an effective evacuation plan.

Life is a struggle for parents of kids attending St. Martha's School, and they have certainly not been made easier by the ever-present dangers caused by the continued operation of the Ben K. Kazarian residential toxic waste dump.

Without suggesting that private rights of business should be disregarded, shouldn't the health, welfare, and safety of citizens have primacy over a profitmaking activity no matter the ends that are served by such profitmaking business, or has Government reached that cold and indifferent age when it has no qualms about a glaring display of poverty and social ethics.

You cannot imagine, gentlemen, how grateful we are that you came down here to listen to us. As you know by now, we have been frustrated by the impotence of local government and the testimony of some people this morning must have given you some insights from this. I use the word impotence not in complete denigration of the efforts of such entities, but merely to describe to you the degree with which they have shown care and concern about our condition here.

We, in this community, are growing impatient for solutions to the dangers caused by the Ben K. Kazarian residential toxic waste dump. I don't intend to sound disrespectful, but no amount of the so-called expert testimony about acceptable risks, tolerable emissions or the absence of additional dangers or significant dangers can completely comfort us.

Only the closure of the BKK facility can.

Gentlemen, the issue is inescapable. Is it sound governmental policy to allow toxic waste facilities in the heart of a densely populated community? If not, what are the alternatives? I have no malice toward those in government who have not seen the situation as I have seen it, but I have a plea for equity and fairness. If I, my wife, and my two kids should suffer from cancer, let it be, but for heaven's sake, let it not be because some mere mortals like me who are in the Department of Health Services, county, State, played God, and by some magic pronounced West Covina is statistically safe from cancer risks and allowed this otherwise beautiful city to become a mecca for cancer-causing chemicals.

Thank you.

[Applause.]

Mr. SKELTON. Thank you.

Mr. Whisenhunt.

Mr. WHISENHUNT. Yes, sir.

Mr. SKELTON. You may proceed.

Mr. WHISENHUNT. May I defer to Mr. Walsh?

Mr. SKELTON. Mr. Walsh.

TESTIMONY OF TOM WALSH, RESIDENT OF WEST COVINA, AND MEMBER, COALITION OF WEST COVINA HOMEOWNERS ASSOCIATION

Mr. WALSH. My name is Tom Walsh and I live in West Covina and I am a member of the West Covina Homeowners Association.

We, the members of the coalition of West Covina Homeowners Association wish to express our appreciation to the subcommittee for traveling from Washington and taking the time to conduct this factfinding hearing. We have waited a long time and had tremendous amounts to say on this subject, as you can see by our written statement of nearly 300 pages, which we submitted in mid-May.

I also have another copy here to submit for your review. It is really just a condensation of the impact of a toxic hazardous dump in a residential area and business community. To our knowledge, this community is the only one of its kind in California. Other residential toxic landfills either have been abandoned or closed in recent years, amidst controversy over public safety and health.

As you know, the California Legislature with the help of some expensive lobbying has seen to it that the toxic dump stays open, despite our concerns. Vast amounts of capital and research effort has been devoted to finding answers to the nuclear waste disposal problem. Chemical waste, which can be just as dangerous to health and just as environmentally persistent, if not more so, has been neglected in comparison, and toxic waste scandals scattered across the country have been the result.

Our businesses, environment, school children and our health and enjoyment of our properties should not be forced to pay the price for a problem that is created by industry and it will not solve.

Allowing this dilemma to go on unattended is creating a disproportionate burden on this community. Industry is carried on for the resultant benefit of the people. Our priority should be people, then land, then industry. Some of our homes are small, most are modest in size, but no less than the rancher or the farmer protecting the sanctity of his land, we feel the need to protect our homes and businesses against being despoiled.

When industry is harmful to people and land, it must be regulated until it no longer is a threat or else ceases to operate. We must never lose sight of these priorities: people, land, then industry. Yet, in the city of West Covina, 583 acres are being destroyed and this isn't destruction enough, so are its people, homes and businesses.

We as nearby residents of this facility have not been given any instruction nor any evacuation plan in the event of a hazardous spill or explosion. I am aware of a plan developed by the city of West Covina Police Department, but no formal presentation has been provided to the residents to my knowledge.

The manuscript that we presented to your committee is the first chapter of a long struggle to identify the possible potential hazards to a residential and business community near this facility. Residents were not made aware of the fact that this facility was a disposal site for all types of toxic hazardous wastes up to but not including nuclear materials.

We will continue writing our story in the hope that it will be used as a guide to prevent exposure to such deplorable conditions as exist in West Covina and, perhaps, protect other communities from such an unhealthy development.

Thank you.

Mr. SKELTON. Thank you so much.

Do you have any comments, Mr. Whisenhunt?

Mr. WHISENHUNT. Yes, Mr. Chairman.

TESTIMONY OF WILLIAM T. WHISENHUNT, COALITION OF WEST COVINA HOMEOWNERS ASSOCIATION

Mr. WHISENHUNT. In response to a tremendous amount of testimony, I have tried to limit my comments. First, I would like to clarify one comment made by Mr. Walsh when he referred to our presentation to the committee as 300 words. I believe he meant to say 300 pages.

Mr. SKELTON. There is a difference.

Mr. WHISENHUNT. Yes, considerable.

The second question I thought I would answer for you personally is the mysterious cloud referred to earlier. I now have the answer to the mystery. The dark cloud over BKK refers to a number of phenomena that have been observed by residents of this community. The white cloud refers to the dust cloud that is developed over BKK's perimeter and floats over the homes of the residents immediately adjacent to it as a result of the truck traffic, as a result of the earth movement and the cutting and the filling and the overlaying of dirt.

As for the dark cloud, on occasions I have myself observed rather substantially large dark clouds persisting for many minutes coming from the dump site. Always I ask the same question. "What is happening now?" Those are the clouds that were referred to in the letter, I am sure.

A number of comments were made concerning the truth. Our concern is and has always been from the beginning to find out the truth, the whole sordid truth, the good, the bad, the indifferent. What we would like to do as a community of homeowners is to make an informed decision, that being whether to stay or whether to run. I feel that in this particular juncture in my life I have enough experience and background and training to take the truth and make appropriate decisions.

What I don't want is an agency, alleged expert, doing a distillation of the information and breaking it down into one simple paragraph saying "Don't worry about it. It is not going to bother you." It seems that as soon as the experts declare it to be safe is immediately when it becomes a disaster and I cite Times Beach, Love Canal, McCall, Stringfellow, just to name a few.

The water monitoring of the BKK site is an interesting issue. BKK does their own monitoring. The State monitors the water approximately twice a month by looking at it and then they do the analysis twice a year. Their defense for the nonmonitoring of the water is the cost.

I am sure you are all aware of well water monitoring. There are a number of ways to rig the monitoring of the wells so that the contents of the wells do not truly represent the underflow, which is passing through that particular strata. This information I have personally received from members of the Environmental Protection Agency during conversations that I have had with them, both at their testing laboratory and with other members that I have met during the 5 years that I have been actively involved in this issue.

The homeowners have pushed the agencies for whatever responsiveness that we have had in this community. Nothing has been done prior to the time that we pushed for their urging to conduct air monitoring tests. This dump has been in operation with toxic materials. Prior to the time that it was permitted to accept materials, it was an open dump. It had materials flowing over the perimeters down the hill, into what is now the Woodside Village area.

State water quality came in, as some of the other agencies did, and said that this is a deplorable condition and, therefore, it has to be cleaned up. If the committee goes to the water reports of the Los Angeles Region Water Quality, which are very thick files, with photographs of the conditions of this dump prior to the time that it was cleaned to the extent that it was made presentable to the eye.

The particular materials contained within our report pose a substantial number of questions asked by water experts with the department of water. To my knowledge, those questions have never been answered. I would invite the staff to pay particular attention to those reports, because I think there is a tremendous amount of information within those reports, particularly in the margins along the sides, written by the governmental experts, different agency experts, asking questions of their findings and those questions were never answered and the basic approval of this dump site was pushed through.

There is a tremendous amount of inadequacies in the initial approval of toxic waste to be dumped. The question that comes to mind is the one presented by EPA saying that they have not received any reports of any violations. My question is, how can you report a violation if you don't look for a violation? The agencies here are not looking for violations. The only thing the agencies have been doing down here is to look for mitigating factors and, therefore, they fail to find the violations until such time as you take them by the hand and lead them to the scene and basically poke their nose in it and say, "OK, now here it is." Even when they do that, even when we do that and even when they take samples and even when they do analysis, one of which, I believe, went back to the congressional library for evaluation, it was so inadequate that the staff from the congressional library could not even comment on it other than to say it is too inadequate to even respond to.

These are the types of responses from the agencies that we have had to put up with continuously year after year. You have often today heard about the barrier that is referred to, two barriers, No. 1 and No. 2. No. 1 barrier is a barrier that is supposedly made of an impermeable materials which will stop any kind of leachate from leaving the dump site. The history of the construction of that barrier is extremely interesting. It was built in a fractured zone. The materials that were used to construct this barrier were designed to be used in a soil that had a uniformity of composition and not a fractured structure.

Some of the techniques used to construct this barrier were the stuffing of rags into the holes because the material that was being poured into the hole was just continually going in and in and in and there did not appear to be any point at which it was going to stop.

The BKK personnel who were monitoring on site were upset because the cost was becoming excessive because they charged by the gallon for this material and they were pouring it into the hole. In order to stop it, they stuffed rags and other debris into the hole in order to plug it up. This is the type of construction that went into that alleged barrier.

Monitoring wells were drilled on the outside of this well. It is my understanding from reading the studies and reports prepared that they—BKK—pump in excess of 2 million gallons of leachate material back into the dump every year that escapes into the wells. My question is what do they do with what escapes the wells through to the underflow and flows into the San Jose channel and the other ground waters? The materials that come out of that dump, in my opinion—because we do not have the finances to do the testing and the evaluation—are finding their way into the ground waters surrounding this area.

We feel that the agencies have done too little, too late and for that reason we deeply appreciate the concern of this Federal hearing. It is our hope that eventually this will lead to the Environmental Protection Agency coming into the city of West Covina, doing their own monitoring and their own independent study.

It has been the practice of other entities who have done studies and have done research in this area to take and be hand-fed and hand-led by BKK and their personnel and then the statistics are given to these different entities by BKK's personnel and those entities then put their name on it and put it out as an independent study, which it is not, and I cite two. EUTEK's people confessed that they were taking data given to them by BKK, massaging it, putting it into a form and then selling it back and saying, "OK, this is the study."

The other one was the alleged USC study as it is sometimes referred to. It is my understanding that USC had nothing to do with the study. Dr. Chinn was hired by BKK to do work. Dr. Chinn happens to be a professor at USC's facility and to my knowledge, there was never a sanction by the university for anything that Dr. Chinn did on the BKK project. I also understand at the conclusion of Dr. Chinn's preparation of his report that he was hired as a consultant by BKK.

At this time, there is probably in existence well over 200,000 chemicals. Of that number, approximately 75,000 of them are commonly used in industry. Today and from admissions of the Department of Health Services, in excess of 60,000 chemicals, and different constituents, go into BKK. Yet, they have only tested for nine. Today, we find out that there were a number of other chemicals, which were tested. We have yet to see that information or to know what the adverse health effects would be from those chemicals.

In addressing the Department of Health Services report and their monitoring, one of the most serious questions we asked, but we have yet received an answer to, and one of the questions that we would like to have propounded to the other entities that have been testifying today is the one of the synergistic effect of these chemicals. I have not heard the word. Everybody seems to be avoiding it, at least from the agencies standpoint. The synergistic effect, as it was explained to me, is the combined effect of many different chemicals upon an organism. We have only talked to vinyl chloride, the health risk of exposure to vinyl chloride over a period of time. We would like to know what the synergistic effect is of all the different chemicals.

Again, I would only say in closing, since I see you have the gavel in your hand, that we have come to understand that there are only two types of landfills: Those which have been disasters, and those which will be disasters.

Thank you.

[Mr. Whisenhunt's prepared statement with attachments follows:]

[Additional submissions of Mr. Whisenhunt are on file with the subcommittee.]

Prepared Statement of William T. Whisenhunt, Coalition of West Covina Homeowners Association

The following materials are presented by the Coalition West Covina Homeowners' Associations ("Coalition") to the Subcommittee on Energy, Environment and Safety Issues Affecting Small Business, in response to the May 5, 1983 request of Chairman Ike Skelton. This statement is a compilation of reports prepared by several members of the Coalition on various aspects of the effects that the operations of the Ben K. Kazarian Residential Toxic/Hazardous Waste Landfill have and will have upon us as residents and patrons of small businesses in West Covina.

The involvement of the Coalition and its members over the past five years (and before) in the issues and problems surrounding the BKK is not easy to summarize. We have been involved with countless officials on every level of government, and in every facet -- legislative, administrative, judicial, investigative and enforcement, and citizen representatives. We have spoken, written, informed, complained, reported, argued, testified, debated, pleaded, organized, requested, petitioned, campaigned, waged recall and initiative efforts, listened, reviewed, investigated, researched, suggested, demanded and urged. All of this has been done by individuals on their own initiative, and at their own expense, without benefit of staff or paid professional assistance, motivated purely in the interest of themselves, their families, their homes and their community. For mutual support, information and a collective voice, the Coalition was formed in 1981, composed of members of numerous homeowners' associations around the BKK, but the individual efforts have also continued unabated. We feel as if our goals are still unmet, but that we have succeeded at least in making the problem much more widely known and understood. Perhaps this will eventually lead to a solution.

A list of actions and involvements of the Coalition and its members is included in this statement; but for every item listed, there are surely ten others not listed, for some of us have consumed nearly every waking minute of the last few years in this pursuit.

In response to the final question of Chairman Skelton's letter, no evacuation plan has been provided to us by any agency outlining actions to take in the event of a hazardous waste spill on the streets of the City or an accident at BKK. The Coalition, and particularly concerned parents of students of St. Martha's Catholic School on Azusa Avenue, immediately adjacent to the site of repeated spills, have strenously pursued such a plan, but to no avail. If a plan has ever been devised, it is a well-kept secret and therefore not of much use.

* * *

We want the hazardous and toxic dumping to stop. It has no place in a populated residential area. You will be told by some that the dump was here first. First of all, this simply is not a true statement. Thousands of homes were built in

West Covina, La Puente and Walnut, and the surrounding unincorporated community of Valinda prior to the commencement of hazardous waste dumping in 1969 and even prior to the opening of the landfill itself in 1963. Second, the quantity of chemicals dumped has increased by orders of magnitude, even after a large percentage of the more recently constructed homes were built. Third, even if BKK had been here first, the character of the community is now overwhelmingly residential as a result of planning and zoning approvals given long ago by the local governments surrounding BKK, and as a result of the half-truths, omissions, and outright lies told to prospective home-buyers and the shortage of affordable homes in the Southern California area. If it ever did, BKK's toxic/hazardous dumping operation certainly has no place now in a community of this character.

We also want some satisfactory arrangement to be implemented by law to provide short and long term fiscal responsibility for the health and environmental damage that is present now and will remain with us for decades and perhaps centuries to come. If this means inclusion of the BKK on the Federal Superfund cleanup list, then that is what we want. An alternate site away from populated areas should be designated immediately, and the necessary changes to the regulatory and tax structure made so as to remove barriers to making alternate technologies commercially viable.

SUMMARY OF INVOLVEMENT IN THE ISSUES AND PROBLEMS SURROUNDING BKK

--Complained to City since 1980 on odors, concerns on ground water contamination;reported odors to Air Quality Management District

--Collected signatures to ban toxic waste dumping at BKK

--Collected signatures to recall 4 unresponsive councilmen

--Letter to Thomas Hannigan, Assemblyman interested in the toxic waste problem , asking for helpful legislation

--Letters to Dr. Stephens and Gov. Brown asking for a health study

--Letters to state official objecting to whitewash of BKK problems

--Letters to state legislators to repeal SB501 preempting local rule

--Monitored every Joint Agency Task Force Meeting that was announced

--Monitored every Task Force Community Representatives meeting that was announced

--Monitored every City Council Meeting for BKK-related issues

--Monitored AQMD Board meetings

--Monitored Planning Commission meetings related to BKK issues such as odor violation and amending UUP hearings

--200 hours of group effort toward UUP amendments

--Monitored hearings of Monterey Park Dump(if it closes, liquid waste will come to BKK)

--Monitored meetings of McColl Dump(if excavated may come to BKK)

--Wrote letters to all the newspapers, some magazines on the BKK problems we experience

--Regularly call the newsmedia (radio, television) on BKK problems

--Contacted Sierra Club, Friends of the Earth and American Lung Association groups for help

--Worked as a group on survey for American Cancer Society

--Contacted legal groups asking for assistance

--Raised funds for expenses of elections, newspaper, etc.

--Published Scentinel, newspaper by the homeowners group

--Distributed flyers door-to-door

--Compiled lists of questions for the various agencies to answer

--Checked all the computer data on the State Dept. of Health Services Emissions Report

--Corrected graphs and data on the State Emissions Report

--Called all the agencies for the readings and results of report

--Joined other organizations interested in toxic waste problems

--Monitored streets south of the dump during heavy rains

--Asked State Dept. of Health Services to take water samples and escorted them to run-off areas

--Monitored Asuza Ave. after rains to see how much mud from trucks was dropping as trucks were exiting the dump

--Reported illegal vehicle action observed, such as: truck marked corrosive leaking brown liquid;truck entering dump at 4:30 a.m., and truck making turn on residential street

--Picketed sales of new homes within 2000 feet of the toxic waste dump,giving out maps of the area

--Took dump tour of BKK

--Took treatment facility tour at BKK

--Testified at Assemblyman Thomas Hannigan's hearing for legislation for bigger fines for polluters

--Contacted professors at universities with questions relating to toxic waste disposal

--Called Waste Watch group for help

--Financially contributed for travel,(to Sacramento and locally) meetings, conventions, research, phone calls, zeroxing, putting propositions on ballot

--Homeowners gave loans to the group for purpose of solving the BKK toxic waste dumping problems

--Picketed BKK dump protesting toxic waste dumping

--Attended meetings of Puente Hills Dump expansion protestors

--Requested and received emissions monitoring station at local homeowner's residence

Conclusion: Concern for the Future of Small Business and the Community

West Covina depends on the continued well-being of many small businesses. Hundreds line the sole access route from the two major freeways intersecting the area, to the BKK Toxic Waste Site. The City is also pursuing redevelopment, hoping to attract more businesses to use office space and hotels. This is by no means a one-company town; the actions or inactions of the local, state and federal government involving BKK's operations have consequences that reach a significant business community.

There are a number of *inequities* operating to the detriment of this community, that can be corrected only through changes in Federal and State laws and policies, because their economic and legal roots extend far beyond the local scale:

1. *Disincentives to technological advances.* Businesses and industries far larger than most of the businesses here bring the hazardous and toxic byproducts of their processes to BKK. The State of California has by preemptive statute insured that BKK will remain open even if against the will of the local community. Concurrently, the State is slowly pursuing policy changes which it claims will eventually phase out the land disposal of many of these chemicals. However, no one will repay us for the direct and indirect economic, health and environmental costs that in the meantime will be forced upon us every single day--spills, emissions

and contamination--until (and if) the State's stated policy is achieved, nor the costs that will persist afterward. Thus, the dumping industries from this State and others, and the consumers of their products, do not pay the full price of the products. Part of the cost is thrown off on this community.

To remove this inequity, the economic disincentive toward technologies that could replace land disposal must be corrected. Dumping will remain the cheapest alternative as long as it is legally permitted and as long as the dumping industries are not legally required to absorb these thrown-off costs to health, business and to government (the taxpayers) for eventual remedy and cleanup, into the cost of their products. Correction of this inequity will necessitate action on the Federal level, through modifications to environmental, tax or other laws and regulations. The superfunding of cleanups under present law will never catch up to the problem. Until laws address the problem of "legal" landfills vs. alternate technologies, the nation will be creating tomorrow's problem sites as yesterday's problems are cleaned up, and the real problem will evade us forever.

2. Superfund inefficencies. Excavated contaminated material from abandoned sites are, in state-of-the-art practice, brought to operating Class I landfills. BKK has received (with revenues accruing to it) materials from several site cleanups, including the publicized Stringfellow

Acid Pits. In the case of BKK and other (if any) residential toxic/hazardous landfills, dangerous materials are moved from one community to another.

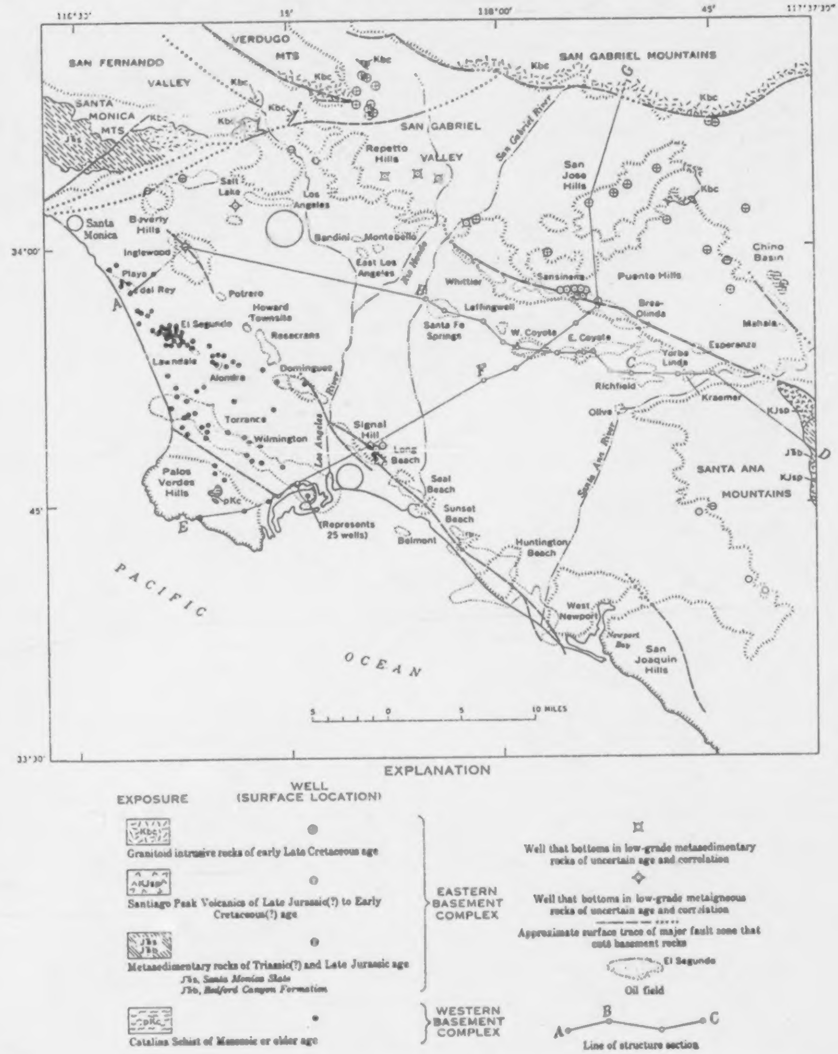
Use of Federal and State superfunds in this senseless manner should be outlawed and forbidden. It is a waste of taxpayer dollars, and it prolongs and drives up the cost of the permanent solution that inevitably must be found. It also sanctions an inequity that blatantly denies protection of this country's environmental laws to some communities.

3. Fiscal responsibility. Short term and particularly long term economic responsibility for health and environmental hazards in the making today, known and unknown, is an extremely difficult issue to address, but failure to address it eventually takes its toll. The asbestos and dioxin examples are classic. Who will be responsible for the health of West Covina residents decades from now, and our businesses which could not survive a "Times Beach" episode? Assertions as to the security of BKK won't help if they are someday proven wrong. Waiting to see if a disaster will materialize won't work either.

Long (and short) term economic responsibility, through mechanisms such as insurance, irrevocable letters of credit and intrusted funds, should be arranged and funded while a landfill is still a going concern, so that the cost can be backed into the charges made for dumping. This is certainly not an unreasonable requirement and should be regarded simply as a cost of doing business in a prudent, responsible manner. If the revenues of the going concern are not tapped for this purpose, the later consequence may be expensive litigation and potential State and Federal fiscal responsibility, and thus everyone's problem.

Through modifications to RCRA, CERCLA and their implementing regulations, the Congress should squarely confront and move into this area.

The Subcommittee's interest in our situation is encouraging. We are most grateful for the opportunity to have presented our concerns, and urgently hope your investigation can help bring solutions within our grasp.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SAN GABRIEL MOUNTAINS
SAN GABRIEL VALLEY
San Gabriel River
Repetto Hills
Salt Lake
Los Angeles
Santa Monica
Beverly Hills
Inglewood
Playa del Rey
Potrero
Howard Townsite
Rosecrans
El Segundo
Lawndale
Alondra
Dominguez
Torrance
Wilmington
Los Angeles River
Signal Hill
Long Beach
Palos Verdes Hills
pKc
(Represents 25 wells)
Seal Beach
Sunset Beach
Belmont
Huntington Beach
West Newport
Newport Bay
San Joaquin Hills
Bandini
Montebello
East Los Angeles
Rio Hondo
Whittier
Leffingwell
Santa Fe Springs
W. Coyote
E. Coyote
San Jose Hills
Sansinena
Puente Hills
Brea-Olinda
Chino Basin
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Santa Ana River
KJsp
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5 0 5 10 MILES
EXPLANATION
EXPOSURE
WELL (SURFACE LOCATION)
Granitoid intrusive rocks of early Late Cretaceous age
Santiago Peak Volcanics of Late Jurassic(?) to Early Cretaceous(?) age
Metasedimentary rocks of Triassic(?) and Late Jurassic age
JSs, Santa Monica Slate
JSb, Bedford Canyon Formation
EASTERN BASEMENT COMPLEX
Catalina Schist of Mesozoic or older age
WESTERN BASEMENT COMPLEX
Well that bottoms in low-grade metasedimentary rocks of uncertain age and correlation
Well that bottoms in low-grade metaigneous rocks of uncertain age and correlation
Approximate surface trace of major fault zone that cuts basement rocks
El Segundo
Oil field
Line of structure section

Figure 5.—Exposures of basement rocks, surface locations of all wells that bottom in basement rocks, surface traces of major fault zones that cut basement rocks, and oil fields of the Los Angeles basin with lines of structure sections (pl. 4).

USGS Professional Paper 420-A

GEOLOGY AND OIL PROSPECTS OF WESTERN SAN JOSE HILLS, LOS ANGELES COUNTY, CALIFORNIA

By Franklin H. Olmsted *

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ABSTRACT

The western San Jose Hills in Los Angeles County form a low upland which rises above the Quaternary alluvium of the San Gabriel River valley. The exposed rocks are folded Miocene and Pliocene sediments which are marginal facies of the rocks of the Los Angeles Basin. Data from several oil wells drilled in the area, and outcrops in the eastern San Jose Hills indicate that the Miocene sediments overlie middle Miocene volcanic rocks, which in turn overlie either pre-Upper Cretaceous coarsely crystalline plutonic and metamorphic rocks or a biotite dacite porphyry of pre-middle Miocene age.

Following the usage of previous workers in the region, the Pliocene rocks have been divided between the upper Pliocene Pico formation and the lower Pliocene Repetto formation. The upper Miocene Puente formation of Eldridge [1] and later workers has been divided into an upper and a lower member. The upper member includes the thin middle member of Woodford [2]

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[1] Eldridge, G. H., and Arnold, Ralph, The Santa Clara, Los Angeles, and Puente Hills oil fields: U. S. Geol. Survey Bull. 309, pp. 102-137, 1907.

[2] Woodford, A. O., Shelton, J. S., and Moran, T. G., Geology and oil possibilities of Puente and San Jose Hills, California: U. S. Geol. Survey, Oil and Gas Inv., Prelim. Map 23, 1944.

Edwards, E. C., Pliocene conglomerates of Los Angeles Basin and their paleographic significance: Am. Assoc. Petroleum Geologists Bull., vol. 18, pp. 786-812, 1934.

Krueger, M. L., The Sycamore Canyon formation, California (abstract): Am. Assoc. Petroleum Geologists Bull., vol. 20, p. 1520, 1936.

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Woodford, A. O., Shelton, J. S., and Moran, T. G., Geology and oil possibilities of Puente and San Jose Hills, California: U. S. Geol. Survey, Oil and Gas Inv., Prelim. Map 23, 1944.

Shelton, J. S., Geological map of northeast margin of San Gabriel Basin, Los Angeles County, California: U. S. Geol. Survey, Oil and Gas Inv., Prelim. Map 63, 1946.

Woodford, A. O., Moran, T. G., and Shelton, J. S., Miocene conglomerates of Puente and San Jose Hills, California: Am. Assoc. Petroleum Geologists Bull., vol. 30, pp. 514-560, 1946.

Some of these works are of special interest, because they deal directly th the area studied in this paper.

Eldridge named the Puente formation and divided it into the three mbers which have been widely used in mapping. However, his map of western Puente Hills was very rudimentary and showed almost no ucture.

English's paper included a map showing structure of the San Jose l Puente Hills. The old 1:62500 scale U. S. Geological Survey topo- phic maps were used as base maps. Although the ages of the forma- ıs shown in the Little Puente and western San Jose Hills must be lified on the basis of later studies, the structure is essentially correct, the lithologic boundaries are well located. This work was the first ous attempt to map the Puente and San Jose Hills in any detail.

Eckis' groundwater paper contains geological maps with data taken n various published and unpublished works available at that time. structure shown in the Little Puente and western San Jose Hills ;es essentially with English's map, but the ages of the formations were ısted to conform with later usage.

The next detailed mapping in the western San Jose Hills, done by dford, Shelton, and Moran, was published in 1944. By this time, the f foraminifera and fish scales in age determinations was more highly loped, and several important changes from the previous maps made.

The paper published by Woodford, Moran, and Shelton in 1946 is a of the source of the Miocene conglomerates in the San Jose and ıte Hills.

STRATIGRAPHY[3]

Basement Complex

Crystalline basement rock is exposed throughout the San Gabriel Mountains 5 to 10 miles north of the San Jose Hills, and is found in wells, beneath the Cenozoic sediments in the San Gabriel Basin, between the San Jose Hills and the San Gabriel Mountains. The major rock types include acidic intrusives of probable Mesozoic age, complex gneisses and schists which are older than the intrusives, and metasediments which may be Paleozoic. Rather extensive mylonite belts are exposed in the eastern San Gabriel Mountains.[4] The middle Miocene Topanga formation in the San Jose Hills contains pebbles and cobbles of mylonite exactly like the eastern San Gabriel Mountains types, so it is reasonable to assume that the crystalline rocks of the San Gabriel Mountains were undergoing erosion at least as early as middle Miocene time.

Crystalline basement rock has been found in wells in the Puente and San Jose Hills and in outcrops near Pomona. Two wells were drilled to basement rock in the western San Jose Hills. A pink granite gneiss was found in the Ohio Oil Company's Legrand No. 1 well at 5073 feet below sea level; and the Texas Company's Garnier No. 1 well more than 2 miles farther west encountered a quartz diorite protomylonite at 5600 feet below sea level.

A dacite porphyry, known locally as "Mountain Meadows" dacite porphyry, has been found in some wells in the San Jose and Puente Hills. It is exposed at the Mountain Meadows Country Club near the eastern end of the San Jose Hills, where it consists of euhedral phenocrysts of biotite and oligoclase and rounded quartz grains in a fine-grained groundmass. It is either a shallow intrusive or an extrusive, and it is evidently older than the middle Miocene Glendora volcanics, as pebbles of dacite have been found in the basal volcanics.[5]

Middle Miocene Rocks

The oldest sedimentary rocks cropping out in the San Jose Hills are exposed in the central part of the hills about a mile east of the mapped area. The dominant lithologic type in the outcrop is a poorly sorted conglomerate and conglomeratic sandstone which is locally called "Buzzard Peak conglomerate."[6] West of the exposed conglomerate, the Ohio Legrand No. 1 well and the Texas Garnier No. 1 well penetrated shale and sandstone of the Luisian and Relizian stages[7] at what appear to be the same horizons. Although the maximum thickness of the Buzzard Peak conglomerate is at least 2800 feet (based on well and outcrop data), very little conglomerate was found in the Ohio Legrand well less than a mile west of the outcrop, and the entire thickness of middle Miocene sediments is only 1800 feet in this well. These middle Miocene sediments, including

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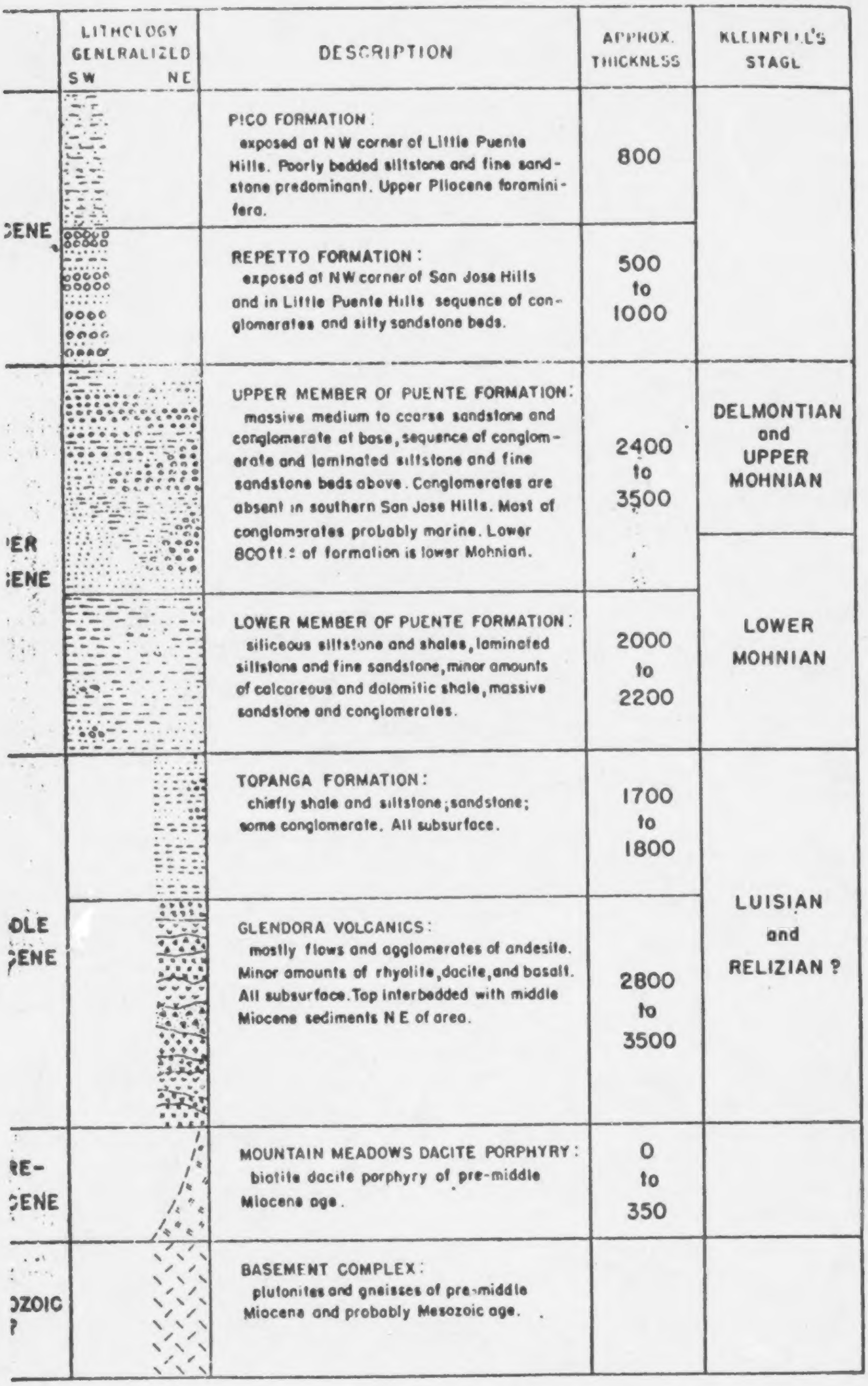
[3] In the nomenclature of sedimentary rocks, C. K. Wentworth's usage is followed. See his *A scale of grade and class terms for clastic sediments* published in Journal of Geology, vol. 30, pp. 377-392, 1922.

[4] Alf, R. M., Mylonites in the eastern San Gabriel Mountains: California Div. Mines Rept. 39, pp. 145-151, 1943.

[5] Shelton, J. S., Geological map of northeast margin of San Gabriel Basin, Los Angeles County, California: U. S. Geol. Survey, Oil and Gas Div., Prelim. Map 63, 1946.

[6] Woodford, et al., op. cit., 1944.

[7] Kleinpell, R. M., Miocene stratigraphy of California, 450 pp., Tulsa, Oklahoma, Am. Assoc. Petroleum Geologists, 1938.



	LITHOLOGY GENERALIZED SW NE	DESCRIPTION	APPROX. THICKNESS	KLEINPELL'S STAGE
ENE		PICO FORMATION: exposed at N W corner of Little Puente Hills. Poorly bedded siltstone and fine sandstone predominant. Upper Pliocene foraminifera.	800	
		REPETTO FORMATION: exposed at NW corner of San Jose Hills and in Little Puente Hills sequence of conglomerates and silty sandstone beds.	500 to 1000	
ER ENE		UPPER MEMBER OF PUENTE FORMATION: massive medium to coarse sandstone and conglomerate at base, sequence of conglomerate and laminated siltstone and fine sandstone beds above. Conglomerates are absent in southern San Jose Hills. Most of conglomerates probably marine. Lower 800 ft.± of formation is lower Mohnian.	2400 to 3500	DELMONTIAN and UPPER MOHNIAN
		LOWER MEMBER OF PUENTE FORMATION: siliceous siltstone and shales, laminated siltstone and fine sandstone, minor amounts of calcareous and dolomitic shale, massive sandstone and conglomerates.	2000 to 2200	LOWER MOHNIAN
OLE ENE		TOPANGA FORMATION: chiefly shale and siltstone; sandstone; some conglomerate. All subsurface.	1700 to 1800	LUISIAN and RELIZIAN ?
		GLENDORA VOLCANICS: mostly flows and agglomerates of andesite. Minor amounts of rhyolite, dacite, and basalt. All subsurface. Top interbedded with middle Miocene sediments N E of area.	2800 to 3500	
RE- ENE		MOUNTAIN MEADOWS DACITE PORPHYRY: biotite dacite porphyry of pre-middle Miocene age.	0 to 350	
OZOIC ?		BASEMENT COMPLEX: plutonites and gneisses of pre-middle Miocene and probably Mesozoic age.		

FIGURE 2. Columnar section, western San Jose Hills.

the Buzzard Peak conglomerate, are probably correlative with the Topanga formation of the Santa Monica Mountains[8] and are so named here.

North and east of the Buzzard Peak region, the Topanga sediments overlie and are interbedded with volcanic flows and tuffs. Approximately 2800 to 3500 feet of these volcanics were found below the Topanga in wells in the western San Jose Hills. Shelton[9] has named these pyroclastics and flows the Glendora volcanics. Pebbles of the Glendora volcanics are very abundant in some upper Miocene conglomerates of the San Jose Hills.

Puente Formation

General Description. The Puente formation, which was named from the Puente Hills by Eldridge,[10] is upper Miocene, and is the approximate age equivalent of the upper part of the Monterey formation of other regions in California.[11] The Puente, as defined by Eldridge, is a sequence of clastic sediments ranging from shale to conglomerate, with various amounts of organic and siliceous shales of the Monterey type. The maximum known thickness of the formation in the Puente Hills has been estimated to be 9000 feet,[12] but the equivalent thickness in the San Jose Hills is between 4400 and 5700 feet.

Eldridge divided the formation into three members to facilitate mapping. A thick massive sandstone occurs near the middle of the sequence in the eastern Puente Hills, so this three-fold division seemed simple and reasonable.

The lithology of the members varies considerably, but the fine-grained sediments of the lower and upper members are typically more laminated and of smaller grain size than the massive medium-grained standstone of the middle member. All three members contain some conglomerate.

This subdivision has been used by most of the later workers in the region. Krueger,[13] however, found that the lower part of the conglomerate-bearing Fernando formation (Pliocene) in the westernmost Puente Hills north of Whittier was really upper Miocene (upper Mohnian and Delmontian stages of Kleinpell), and assigned a new name, Sycamore Canyon formation, to this sequence.

Woodford[14] used the lower-middle-upper member subdivision in the general map of the Puente and San Jose Hills. However, this division of the Puente formation is rather difficult to use in the San Jose Hills where the massive sandstone near the middle of the section is thin and interfingers with finer and coarser sediments in a confusing way.

The writer feels that a more natural and logical solution of the problem in the San Jose Hills is to use only the upper and lower members and place Wodford's thin middle Puente member at the base of the upper Puente.

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[8] Hoots, H. W., Geology of the eastern part of the Santa Monica Mountains, Los Angeles County, California: U. S. Geol. Survey Prof. Paper 165c, 134 pp., 1930.

[9] Op. cit.

[10] Op. cit.

[11] Bramlette, M. N., The Monterey formation of California and the origin of its siliceous rocks: U. S. Geol. Survey Prof. Paper 212, 57 pp., 1946.

[12] Woodford, et al., op. cit., 1944.

[13] Krueger, Max L., The Sycamore Canyon formation, California (abstract): Am. Assoc. Petroleum Geologists Bull., vol. 20, p. 1520, 1936.

[14] Op. cit., 1944.

Table 1. Upper Miocene Pebble Counts.

Description of location	No. feet above base of upper Puente	No. pebbles examined
ite of McCartney Hurley No. 1 well, elev. 575 ft., Little Puente Hills. 10,770 ft. W, 7,290 ft. N of SE. corner of Puente sheet	2850	33
,000 ft. W, 7,620 ft. N of SE. corner of Puente sheet; elev. 705 ft., Little Puente Hills	2700	33
.0,280 ft. W, 6,570 ft. N of SE. corner of Puente sheet; elev. 495 ft., Little Puente Hills	2600 (?)	34
,310 ft. W. 7,650 ft. N of SW. corner of Puente sheet; elev. 550 ft., Little Puente Hills	2400	33
,290 ft. W. 13,580 ft. N of SE. corner of Puente sheet; elev. 590 ft., San Jose Hills	1750 (?)	33
,660 ft. W, 15,920 ft. N of SE. corner of Puente sheet; elev. 555 ft., San Jose Hills	1150	50
,080 ft. W, 12,460 ft. N of SE. corner of Puente sheet; elev. 630 ft., San Jose Hills	1000	33
,300 ft. W, 14,040 ft. N of SE. corner of Puente sheet; elev. 550 ft., San Jose Hills	930	50

	Percentage at								
ck type	P6	P8	P9	P11	P7	P12	P10	P13	Average
rtz-feldspar plutonite	25	25	26	19	21	26	34	25	25½
e-quartz-feldspar plutonite	6	3	0	0	6	3	0	0	2
	3	0	8	12	2	15	3	3	6
te	0	6	0	6	0	3	3	0	2
	12	12	8	15	6	6	12	6	9½
orphyry	0	3	8	0	2	12	3	9	5
ntonites and dike rocks	46	49	50	52	40	65	55	43	50
artz-feldspar orthogneiss	12	9	10	15	6	12	18	27	13½
rnblende-quartz-feldspar gneiss	0	0	0	0	0	0	0	3	½
eldspar)-quartz paragneiss	3	18	8	3	12	9	12	6	9
ornblende-biotite schist	0	0	0	3	0	0	0	0	½
te	0	6	2	0	10	0	0	0	2
etamorphic rocks	15	33	20	21	28	21	30	36	25½
BASEMENT COMPLEX TYPES	61	82	70	73	68	86	85	79	75½
e, andesite porphyry, basalt	15	6	14	15	16	14	6	6	11½
quartz latite, rhyolite	0	3	4	0	0	0	3	6	2
volcanic rock	24	9	14	12	16	0	6	9	11
GLENDORA VOLCANICS TYPES	30	18	32	27	32	14	15	21	24½

ower Member. All of the lower member of the Puente formation : western San Jose Hills belongs in Kleinpell's lower Mohnian ige. The thickness, indicated from wells and outcrop, is about 2000)0 feet, and consists mainly of siliceous fine-grained rocks, with partings of clastic sediments, beds of impure limestone or dolomite, nall amounts of massive sandstone and conglomerate.

'he most abundant type is a finely banded porcelaneous siltstone hale with pairs of laminae as thin as about 0.1 millimeter. Some of ck breaks into rectangular slabs, with one fracture plane parallel bedding and the other two perpendicular. The lithology is of the ilica type of Monterey, as described by Bramlette.[15]

Op. cit.

Throughout most of the lower member, thin beds of clastic siltstone and fine sandstone are intercalated with the siliceous rocks. Locally this material becomes more abundant than the porcelaneous siltstone and shale and may form zones of well-laminated siltstone and fine sandstone as much as several feet in thickness.

In at least two places, both of them near the axis of the San Jose anticline and therefore low in the section, lenses of massive, fine- to coarse-grained sandstone as much as 350 feet in thickness occur in isolated bodies in the finer-grained sediments. The lateral gradation from siltstone and shale into sandstone is in most places strikingly abrupt, although the sandstone body south of Hills 1268 and 1296 grades into laminated siltstone and fine sandstone and then into porcelaneous siltstone on its western margin. In most cases the vertical gradation is also abrupt, probably indicating a sudden but very local change in depositional environment.

The abundance of carbonate beds and concretions is a striking feature. The beds, almost all between 10 inches and 3 feet thick, are gray, buff, or yellow-brown in color, and range in composition from nearly pure limestone or dolomite to calcareous fine sandstone. These strata recur at fairly regular intervals throughout the section, and their stratigraphic separation is seldom less than 10 feet. The carbonate concretions form ellipsoidal masses up to several feet across in the porcelaneous siltstone and shale.

A general estimate of the relative abundance of the lithologic types in the lower Puente in the western San Jose Hills, based on the best exposures seen, is: siliceous and porcelaneous siltstone and shale, 50 percent; laminated clastic siltstone and fine sandstone, 30 percent; massive, medium-grained sandstone, 10 percent; calcareous and dolomitic rocks, 10 percent.

Upper Member. The upper member of the Puente formation, as defined in this report, corresponds to Woodford's middle and upper members of the Puente formation in the San Jose Hills.[16] Generally speaking, the upper Puente in the western San Jose Hills consists of a basal unit of massive medium- to coarse-grained sandstone and conglomerate, which is equivalent to Woodford's middle Puente member; and a sequence of fine-grained sediments and conglomerates, which is equivalent to Woodford's upper Puente member. The maximum thickness, based on surface and subsurface data, is 3500 feet in the Little Puente Hills and 2400 feet at the western end of the San Jose Hills proper.

The basal sandstone varies considerably in thickness and character. It is about 970 feet thick in the McCartney Hurley No. 1 well in the Little Puente Hills, and becomes thinner east of this point. Massive sandstone 125 feet thick is exposed on the west nose of the San Jose anticline, where the outcrop consists chiefly of dip slopes developed on the more indurated horizons. As the sandstone is traced farther east, it thickens again and becomes coarser and even conglomeratic. Most, if not all, of this thickening is caused by an eastward coarsening in the overlying finer-grained sediments. The base of the sandstone and conglomerate seems to remain at about the same horizon. The maximum thickness of interbedded sandstone and conglomerate in the eastern part of the mapped area is about 900 feet, on both the south and north limbs of the

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[16] See also Woodford, A. O., et al., op. cit., 1944.

San Jose anticline. Apparently all of this, with the possible exception of the highest conglomerate, is lower Mohnian. The basal sandstone appears to be missing on the south limb of the Little Puente Hills anticline, where clastic siltstone and fine sandstone directly overlie lower Puente porcelaneous siltstone and shale.

Most of the sandstone is massive and medium grained, with subangular to subrounded grains of quartz, feldspar, biotite, and muscovite. Fresh surfaces are gray to white, while weathered surfaces are apt to be anything from dark brown to light gray, depending on the amount of iron oxide stain.

A considerable amount of well cemented very coarse sandstone occurs in the eastern area. The sandstone grades into granule conglomerate, through which are scattered boulders up to 3 feet across. The relative scarcity of clasts of pebble size, compared to the stratigraphically higher conglomerates, is curious. Most striking of the larger boulders are a purplish-red vesicular andesite or basalt and a peculiar very hard tourmaline-actinolite quartz plutonite.[17]

The sediments overlying the basal sandstone and conglomerate consist of a sequence of conglomerates and fine-grained clastic rocks, except in the southernmost part of the area, where conglomerate is lacking. This sequence, except for the lower 300 or 400 feet, is mostly upper Mohnian, though some of the nonfossiliferous strata near the top of the formation may be Delmontian.

Most of the fine-grained sediments are well-laminated clastic siltstone and fine sandstone, with a minor amount of porcelaneous siltstone and shale immediately above the massive sandstone on the west nose of the San Jose anticline. The clastic siltstone and fine sandstone are rhythmically bedded in pairs of laminae ranging from an eighth of an inch to 2 inches in thickness. The siltstone is medium to dark gray when fresh and light gray to white on weathered surfaces. This contrasts strongly with the buff or yellow color of the fine sandstone, giving the rock a banded aspect. Grains of muscovite, biotite, quartz, feldspar, and clay minerals can be distinguished with a hand lens, but some of the siltstone grades into shale, in which none of the mineral grains can be identified with certainty.

Not all of the fine sediments are well laminated. Some of the higher beds are characterized by fine sandstone with the hackly fracture and absence of bedding which is more typical of the Pliocene rocks.

The conglomerates which lie above the basal sandstone-conglomerate unit are typically well sorted and poorly cemented. Locally the cementation may be strong enough to permit vertical exposures of conglomerate several feet high. On the north limb and around the west nose of the San Jose anticline the lowest conglomerate in this sequence is remarkably uniform in thickness and general lithologic character; it can be traced from Cameron Avenue at the northeast corner of the mapped area southwestward as far as Hill 807 near the Supreme Dairy. It disappears south and west of here, however, and it is not found in the Shell Garnier No. 1 well, nor in the Little Puente Hills. The higher conglomerates are less uniform in thickness along the strike, but they persist into the Little

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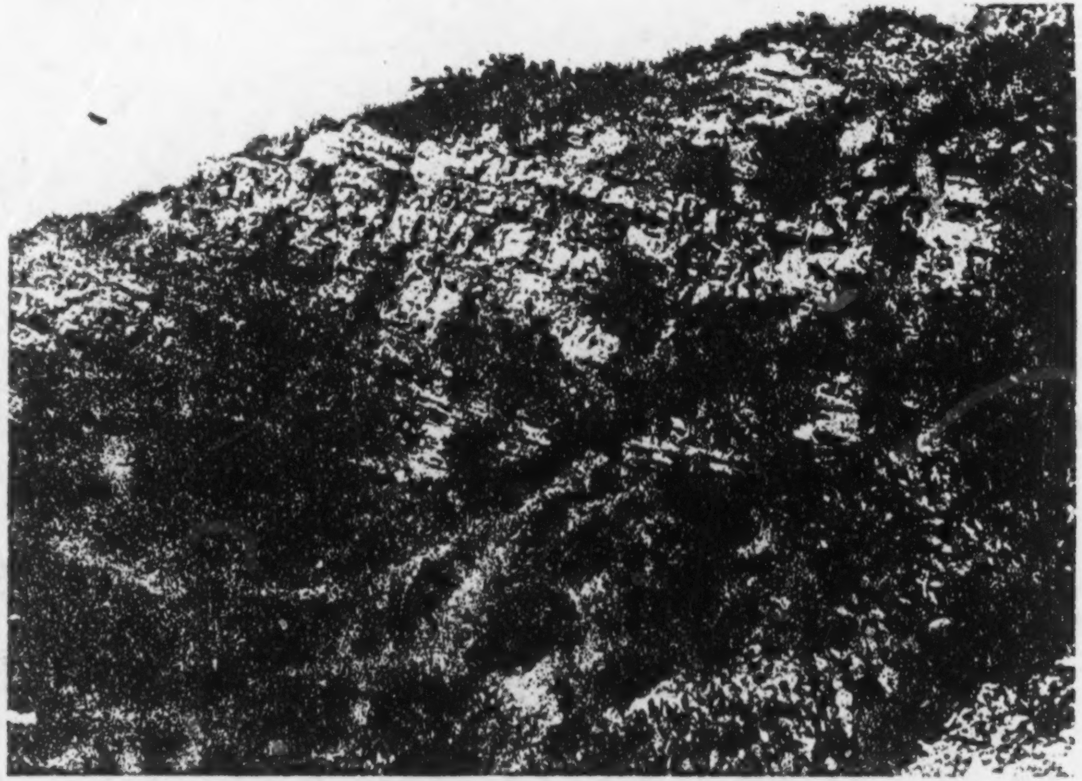
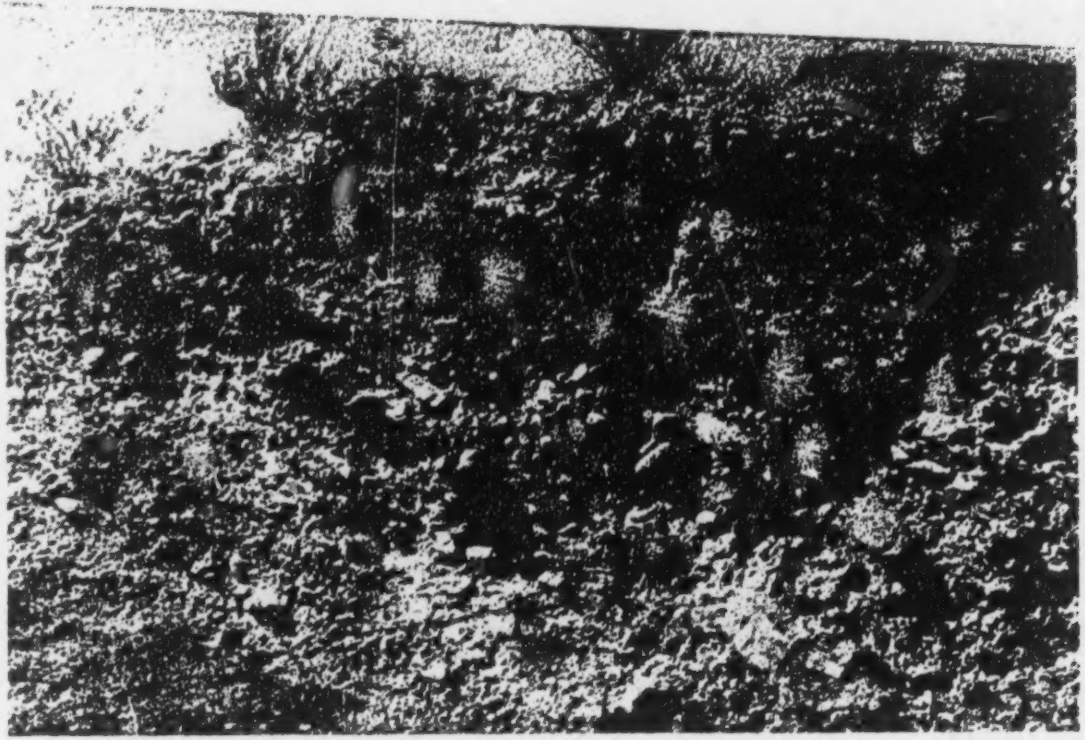
[17] See also Woodford, A. O., Moran, T. G., and Shelton, J. S., Miocene conglomerates of Puente and San Jose Hills, California: Am. Assoc. Petroleum Geologists Bull., vol. 30, p. 526, 1946.



SANDSTONE AND INTERBEDDED CONGLOMERATE.
UPPER MEMBER, PUENTE FORMATION

The hard, well-bedded, medium to coarse sandstone with some interbedded conglomerate is typical of the lower part of the upper member of the Puente formation, in the eastern part of the mapped area. This exposure is on the north limb of the San Jose anticline.



VERTICAL EXPOSURE OF WELL-SORTED AND CEMENTED CONGLOMERATE

Upper member of the Puente formation in northwestern San Jose Hills. Bedding can be distinguished by size sorting of pebbles and cobbles, and by occasional beds of sandstone.

Puente Hills, where they become very thick and extensive. None of these conglomerates is present in the southernmost part of the San Jose Hills.

Probably the most striking single feature of the upper Puente conglomerates is the presence of numerous cobbles and boulders of a very hard, pale green and lavender colored tourmaline-actinolite granite or quartz monzonite.[18] This rock typically contains orthoclase (or microcline), albite, quartz, actinolite, and in some cases, tourmaline. Some of the boulders are quite large; the largest found was 48 by 32 by 30 inches and was estimated to weigh more than 1 ton. Evidently most of this rock was removed from the source area by erosion before the Pliocene, as few boulders of it are found in the Pliocene conglomerates, and none is known to occur in any of the possible source regions today.

Repetto Formation

The name Repetto formation was proposed in 1930 by a committee of the Pacific Section of the Society of Economic Paleontologists and Mineralogists to apply to the siltstone of lower Pliocene age exposed in the Repetto Hills east of Los Angeles.[19] The type locality is on the west side of Atlantic Boulevard in the Repetto Hills, where a section of siltstone about 2000 feet thick is exposed. The lower part of the formation is not exposed here, but is found half a mile to the west, as about 500 feet more of siltstone.

The maximum thickness of Repetto exposed in the Puente Hills north of the Whittier fault is 2700 feet.[20] The lithology here is coarser than in the type area to the west, and there are several thick conglomerate lenses.

In the Little Puente and western San Jose Hills, the Pliocene-Miocene contact cannot be established on faunal evidence. The entire sequence of strata between the upper Mohnian locality F17 at Hill 651 in the western San Jose Hills, and locality F19 of upper Pliocene age in the northwestern Little Puente Hills, is barren of diagnostic foraminifera. In the Puente Hills to the south and west, across the valley of San Jose Creek, fossiliferous Repetto overlies the upper Puente conformably, and fossiliferous upper Pliocene Pico lies on the Repetto with apparent conformity.[21] There, the Repetto consists of sandy, micaceous siltstone with hackly fracture and lack of bedding lamination, alternating with lenses of conglomerate. This lithology is well developed in the Little Puente Hills, and, although fossils are lacking, it seems reasonable to assign at least some of the sequence below the fossiliferous upper Pliocene to the Repetto formation.

Inasmuch as both the lower and upper boundaries of the Repetto in the Little Puente Hills had to be selected arbitrarily, the most prominent lithologic breaks, which could be traced for a considerable distance along the strike, were chosen. The lower boundary (Pliocene-Miocene) was placed at the base of the conglomerate that forms the principal east-west drainage divide. The upper boundary was placed at the top of the highest conglomerate.

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[18] See also Woodford, A. O., op. cit., 1946.

[19] Reed, R. D., Section from the Repetto Hills to the Long Beach oil field: Int. Geol. Cong., 16 sess., Guidebook 15, Excursion C-1, Southern California, p. 31, 1932.

[20] Woodford, A. O., and Davless, S. N., Stratigraphy and structure of northwestern Puente Hills, California: U. S. Geol. Survey Oil and Gas Inv., Prelim. Map 83, 1949.

[21] Woodford and Davless, op. cit.

There is some justification for the selection of the particular Pliocene-Miocene contact chosen in the Little Puente Hills. Most of the conglomerates and fine-grained sediments lower in the section are very lenticular and show very abrupt lateral gradation in grain size. The contact between this conglomerate and the underlying fine sandstone bed, by contrast, can be traced throughout the Little Puente Hills with little or no change in stratigraphic position. Moreover, there is a vertical change in the lithology of both the conglomerates and the fine-grained sediments, which, although it is gradational, is definite enough to be significant. All of the upper Puente conglomerate beds contain various amounts of the distinctive tourmaline-actinolite quartz monzonite or granite. No cobbles or boulders of this type of granite have been found above the arbitrary Pliocene-Miocene contact in the Little Puente Hills, and very few are present in the highest conglomerate in the northwestern San Jose Hills. None of the fine-grained sediments mapped as Repetto has the fissility and thin laminated character of the upper Puente beds. Here, again, the vertical change is gradational, but the gradation takes place in the sediments below the arbitrary contact.

Table 2. Pliocene Pebble Counts.

Locality	Description of location	No. feet above base of Pliocene	No. pebbles examined
P5	12,490 ft. W, 8,570 ft. N of SE. corner of Puente sheet; elev. 600 ft., Little Puente Hills	500	68
P4	10,720 ft. W, 5,910 ft. N of SE. corner of Puente sheet; elev. 512 ft., Little Puente Hills	?	50
P3	6,240 ft. W, 15,480 ft. N of SE. corner of Puente sheet; elev. 490 ft., San Jose Hills	150	100
P2	9,580 ft. W, 8,980 ft. N of SE. corner of Puente sheet; elev. 735 ft., Little Puente Hills	60	50
P1	11,640 ft. W, 8,310 ft. N of SE. corner of Puente sheet; elev. 630 ft., Little Puente Hills	30	33

	Percentage at					
Rock type	P1	P2	P3	P4	P5	Average
Mica-quartz feldspar plutonite	37	30	30	40	52	38
Alaskite	0	10	4	12	0	5
Pegmatite	3	0	1	0	4	1½
Aplite	9	16	17	12	18	14½
Dacite porphyry, granodiorite porphyry	6	0	5	10	3	5
Total plutonites and dike rocks	55	56	57	74	77	64
Mica-quartz-feldspar orthogneiss	9	26	19	--	4	11½
Hornblende-quartz-feldspar orthogneiss	3	0	3	--	0	1
Mica-(feldspar)-quartz paragneiss	12	8	8	--	7	7
Undifferentiated gneiss	--	--	--	18	11	6
Total metamorphic rocks	24	34	30	18	22	25½
TOTAL BASEMENT COMPLEX TYPES	79	90	87	92	99	89½
Andesite, andesite porphyry, basalt	21	2	5	8	0	7
Dacite, quartz latite, rhyolite	0	4	7	0	1	2½
Rotten volcanic rock, unidentifiable	0	4	1	0	0	1
TOTAL GLENDORA VOLCANIC TYPES	21	10	13	8	1	10½

It is possible that the highest conglomerate exposed east of the Shell Garnier No. 1 well, which is located just west of Pass and Covina Road, is Pliocene. Tourmaline-actinolite-quartz plutonite cobbles and boulders are very rare in this conglomerate, and the lithology is otherwise very similar to the lithology of the conglomerates assigned to the Repetto in the Little Puente Hills.

The Repetto formation, as mapped in the Little Puente Hills, consists of siltstone beds alternating with fine sandstone and conglomerate beds which vary considerably in thickness along the strike. The siltstone and fine sandstone are traceable as beds for some distance along the strike, and as lenses within the conglomerate. The siltstone is predominantly sandy and micaceous. Quartz, biotite, muscovite, feldspar, and clay minerals can be seen with a hand lens. Weathered surfaces are light gray or buff in color; fresh surfaces are light to medium brown. The cementation is usually poor. Stratification is seldom visible, except where finer-grained beds of siltstone are present. The rock is nearly always irregularly fractured, and white caliche fills many of the cracks.

A section, measured with tape and Brunton compass on the first ridge northwest of Hill 806 in the Little Puente Hills, gave a thickness of about 530 feet for the Repetto. Roughly half of this thickness is conglomerate; the remainder is poorly bedded, soft, silty sandstone. As shown on the geologic map, most of the sandstone lenses out to the west, around the nose of the Little Puente Hills anticline. East of the measured section, the thickness of Repetto increases to about 1000 feet.

Repetto Section in Little Puente Hills
(Measured on ridge on north flank of hills, immediately west of Hill 806)

Top of section	Thickness (feet)
Massive, buff to gray silty fine sandstone. Biotite flakes abundant. Foraminifera of lower Pico age (upper Pliocene) found 400 feet above the base of this sandstone at locality F19, which is about half a mile west of the measured section. Base of this sandstone arbitrarily taken as base of the Pico and top of the Repetto	(Top not exposed)
Conglomerate. Mostly well sorted; rounded and subrounded pebbles average less than 3 inches in diameter, are fairly well cemented in a medium to coarse sandy matrix. Pebbles and cobbles are predominantly plutonic and metamorphic rocks, but volcanics are common	65
Fine gray sandstone, with a few thin beds of conglomerate. Sandstone is micaceous, highly fractured, poorly bedded, and soft. Conglomerates are composed of well-rounded pebbles	95
Fine sandstone and conglomerate. Pebbles and cobbles are generally more abundant than in above; otherwise same lithology	71
Massive, hard, fine gray sandstone. Contains from 5 to 10 percent biotite and abundant altered feldspar grains and clay minerals. Cementing material is somewhat calcareous	2
Gray to yellowish fine sandstone. Micaceous, highly fractured, poorly bedded, and soft	117
Conglomerate. Mostly poorly sorted; pebbles and cobbles subrounded, up to 6 inches in diameter. Volcanic pebbles not uncommon. Matrix course, sandy, poorly cemented	31
Pebbly fine sandstone. Pebbles sparse at top, becoming much more abundant near base. Sandstone is fine-grained, buff-colored, micaceous, highly fractured, poorly bedded, and soft	101
Conglomerate. Fairly well sorted, with many small pebbles. Volcanic pebbles estimated to make up about 10 percent of total	45
Total thickness	527

Pico Formation

The Pliocene rocks in the coastal region of southern California were ded in the Fernando group of Pliocene and Pleistocene age by Homer in.[22] In 1924, W. S. W. Kew divided the Pliocene deposits on the side of the San Fernando Valley into two formations; the lower was the Pico, the upper the Saugus. The Pico was assigned to the lower ne on the basis of fossils. It lies unconformably on the upper Miocene lo formation in this region.[23] More recently, the Pico has been cted to upper Pliocene.[24] A fossil locality in the Pico near the Han- Dairy in the northwestern Puente Hills has yielded upper Pliocene inifera as well as numerous megafossils. The maximum thickness Pico in the northwestern Puente Hills is approximately 1400 feet.[25] ear evidence of unconformity with the underlying Repetto for- n has been discovered in the area.

n the absence of diagnostic fossils lower in the section, the base of ico has been arbitrarily placed just above the uppermost con- rate in the northwestern Little Puente Hills. The exposed thickness formation is about 790 feet.

The Pico sediments in the Little Puente Hills are, for the most part, geneous fine sandstones and siltstones. A sandy, micaceous siltstone minates. As in the Repetto, the bedding is very indistinct, and e distinguished only by the thin partings of finer-grained siltstone. e these partings are absent, it is very difficult to ascertain the atti- of the bedding. The rock is brown on fresh surfaces, and weathers to ed light gray and buff. The important minerals are muscovite, e, quartz, feldspar, and clay minerals probably derived from feld- The rock is poorly cemented, and highly fractured. Caliche fills of the joints and fractures. The soil that developed from this rock ark brown loam which supports a growth of wild oats and grasses.

Quaternary Alluvium and Terrace Deposits

Undeformed and poorly consolidated alluvium and terrace deposits cent and probable late Pleistocene age cover the older rocks on the ins of the hills. No attempt has been made to differentiate the allu- and the older terrace deposits on the geologic map, as this distinction no importance for the purpose of this report.

SOURCE OF THE CONGLOMERATES

Woodford, Moran, and Shelton,[26] in their paper on the Miocene lomerates of the Puente and San Jose Hills, concluded that the most source region of the conglomerates extended from the western San iel Mountains eastward in a 120-degree arc to the southeastern San iel Mountains, and possibly to the Perris block.

In order to cast more light on this problem, pebble counts were at 13 localities in the Little Puente and western San Jose Hills, and

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Unpublished manuscript. See Eldridge and Arnold, op. cit.

Kew, W. S. W., Geology and oil resources of a part of Los Angeles and Ventura les, California: U. S. Geol. Survey Bull. 753, 202 pp., 1924.

Hoots, H. W., General geology of the Los Angeles Basin: Int. Geol. Cong., 16th Guidebook 15, Excursion C-1, Southern California, p. 24, 1932.

Woodford and Daviess, op. cit.

Op. cit., 1946.

some of the typical San Gabriel Mountains rock types were examined megascopically and microscopically. The general procedure outlined by Bellemin[27] was followed in making each pebble count. Table 1 summarizes the results at the eight upper Puente (later upper Miocene) localities; table 2 lists the data for the five Repetto (lower Pliocene) localities. All of the localities are on the Puente quadrangle and are arranged in approximate stratigraphic sequence in each table.

The results of the investigations support Woodford's[28] conclusions as to the source of the conglomerates. In addition to fairly numerous pebbles of the Mt. Waterman granite of Arnold and Strong,[29] the writer found such diagnostic types as Mountain Meadows dacite porphyry[30] and a very distinctive type of hornblende andesite porphyry, which is known to occur as a dike rock in the eastern San Gabriel Mountains.

The extreme scarcity of mylonite pebbles is a perplexing problem. Mylonite is an abundant rock in the eastern San Gabriel Mountains, and it is very well represented in the middle Miocene Buzzard Peak conglomerate. Possibly the source region for the upper Miocene and lower Pliocene conglomerates of the Little Puente Hills and westernmost San Jose Hills did not extend quite as far east as the present mylonite areas.[31]

The scarcity of hornblende-bearing plutonites and orthogneisses in the conglomerates is another interesting problem. An examination of 50 pebbles and cobbles sampled at random from Recent detritus in San Antonio wash, about 15 miles northeast of the Little Puente Hills, showed that hornblende-bearing orthogneisses and plutonites made up 38 percent of the total, while similar rocks comprise but 1 percent of the total of the 13 conglomerate localities. This disparity might be explained by Bramlette's theory of the instability of hornblende in sedimentary rocks.[32]

Comparisons of the ratios of basement complex rock types to Glendora volcanics types at the various localities reveal an important fact: The proportion of volcanic rocks generally decreases, going up in the section. The average proportion of volcanic rocks is 10½ percent of the total for the five Repetto localities, but it is 24½ percent for the eight upper Puente localities. At one upper Puente locality in the northeastern part of the mapped area, volcanic rocks make up more than 80 percent of the total. In general, at any given horizon, the proportion of volcanic rocks increases northeastward. This might be expected, as most of the present outcrops of Glendora volcanics are northeast of the Little Puente and western San Jose Hills.

STRUCTURE

Folds

Folds, rather than faults, are the dominant structural features of the western San Jose Hills. Two anticlines and an intervening syncline, all trend generally eastward. They are the northern, or San Jose anticline (the San Jose Hills anticline of English[33]); the southern, or Little Puente Hills anticline; and the Amar syncline, named from Amar Road. In addition to these three major folds, there are a few small folds of minor importance.

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[27] Bellemin, G. J., Petrology of Whittier conglomerates, southern California: Am. Assoc. Petroleum Geologists Bull., vol. 24, pp. 649-671, 1940.

[28] Op. cit., 1946.

[29] Arnold, Ralph, and Strong, A. M., Some crystalline rocks of the San Gabriel Mountains, California: Geol. Soc. America Bull., vol. 16, pp. 183-204, 1905. See also Bellemin, G. J., op cit.

[30] Shelton, J. S., op. cit.

[31] See Alf, R. M., op cit.

[32] Bramlette, M. N., The stability of minerals in sandstone: Jour. Sedimentary Petrology, vol. 11, no. 1, pp. 32-36, 1941.

San Jose Anticline. The San Jose anticline is the most important structural feature of the western San Jose Hills. This fold is clearly shown topographically by the main high mass of the hills. The crest of this anticline, which follows closely the principal drainage divide, is broad and gently undulating, and has been located only approximately on the geologic map. The bearing of the axis at the eastern end of the mapped area is about N. 65° E. Westward, the axis curves gently northward, so that west of Hill 1268, the bearing is almost due east.

The San Jose anticline is strongly asymmetric at the eastern boundary of the mapped area. Here, the north limb is gently inclined, with dips averaging 25 degrees. The south limb is steeper and is cut off abruptly by a steep fault, along which the southern block has been dropped. Farther west the fold is still asymmetric, but the fault on the south limb has probably changed to a sharp flexure instead of an actual break. Still farther west, the anticline becomes more symmetrical and starts to form the broad nose at the western end of the hills. The nose axis has a westward plunge of about 30 degrees.

Amar Syncline. Like the San Jose anticline, the Amar syncline is asymmetric in the east, with a steep north limb and gentle south limb, and becomes symmetrical and westward-plunging farther west. The westward plunge begins about half a mile east of the Supreme Dairy and steepens to 20 degrees at the Dairy. The synclinal axis is half to three-quarters of a mile south of the San Jose anticline axis, and closely parallels it. The trough of the syncline appears to continue west of Pass and Covina Road, passing north of the Little Puente Hills beneath the alluvium.

Little Puente Hills Anticline. The western part of the Little Puente Hills anticline is revealed topographically by the Little Puente Hills, but it is less clearly revealed farther east, in the San Jose Hills. The eastern end of the anticline is a broad nose which plunges eastward at 15 to 30 degrees. The western end of the anticline in the Little Puente Hills plunges westward at an angle of about 30 degrees.

Throughout most of its extent the Little Puente Hills anticline is symmetrical, but it is overturned southward at the east end of the Little Puente Hills. Here the dips of both the north and south limbs are about 55 degrees, indicating a 55-degree northward dip of the axial plane. Associated with this overturning is a sharp southeastward bend in the axis, which suggests lateral pressure from the north, east of the bend in the axis.

Minor Folds. A small anticline and syncline lie between the Amar syncline and the Little Puente Hills anticline in the vicinity of the Chanslor-Canfield Midway Oil Company Sentous No. 1 and Bardeen Puente No. 1 wells. The exact position of the axes of these folds is impossible to determine because of the poor exposures, but the C. C. M. O. well seems to have been located near the axis of the anticline, which has a northwest bearing here. Actually, this structure may be considered as a double crest on the Little Puente Hills anticline, the northern crest disappearing to the west.

The "wrinkle" on the nose of the San Jose anticline southwest of Hill 1078 is another minor fold. This small fold, which in part accounts for the strange outcrop pattern here, is strikingly shown by a limestone bed just above the upper Puente sandstone, which changes in attitude from N. 65° E., 30° SE. to N. 25° W., 55° SW. in a distance of less than 10 feet along the strike.

The brittle and incompetent porcelaneous shale and siltstone beds of the lower Puente are locally highly contorted. Attitudes taken at isolated outcrops are usually unreliable; consequently only attitudes that show persistent areal trends in the lower Puente are shown on the geologic map.

Faults

San Jose Fault. Evidence for most of the faults in the Little Puente and western San Jose Hills is unfortunately indirect and often very obscure. Perhaps the best marked and most important is the San Jose fault which drops the south limb of the San Jose anticline near the eastern border of the mapped area. The steep escarpment on the south side of the main east-west drainage divide is the principal topographic expression of the fault; other evidence includes a brecciated zone of porcelaneous shale blocks and caliche, and sudden steepening of dips and local overturning near the fault zone. There is no positive evidence of the amount of displacement, but all indications are that it decreases westward and finally changes to a sharp flexure. The fault plane seems to be nearly vertical. The fault trace strikes about N. 60° E., or nearly parallel to the axis of the San Jose anticline. The movement on the fault has probably been vertical, the south block being downthrown.

Little Puente Hills Fault. The southern margin of the Little Puente Hills may be determined by a west-striking fault which has dropped the south block. This fault apparently passes through the gap between the main mass of the hills and two low knolls to the south in the western area. The relative movement is inferred from the fact that Repetto lithology is found on top of Knoll 512, whereas if the Little Puente Hills anticline were not faulted, the trend of the beds would bring upper Puente strata to this position. If it is assumed that the top of Knoll 512 is near the base of the Repetto, the displacement is between 600 and 800 feet. In the absence of evidence to the contrary, it is assumed that the fault surface is vertical and that movement has been vertical.

Other Faults in Little Puente Hills. At least one fault is associated with the sharp bend in the axis of the Little Puente Hills anticline in the east-central Little Puente Hills. This fault seems to branch out from the Little Puente Hills fault 2000 feet south of Hill 728. The strike of the fault is about N.45° W., or parallel to the bend of the axis. The displacement does not seem to be large and dies out northwestward. The southwestern block is downthrown.

There is a discrepancy between the data obtained from the McCartney Hurley No. 1 well and the Bardeen Crittenden No. 1 well in the central Little Puente Hills. The lower 700 feet of conglomerate in the McCartney Hurley well cannot be accounted for by the width of outcrop and dip of the exposed conglomerate to the east of the well. This problem could possibly be solved by extending the fault discussed in the preceding paragraph northwestward between the two wells, were it not for one fact:

the base of the massive sandstone of the upper Puente is stratigraphically 700 feet higher in the McCartney well than in the Bardeen well. If the displacement on the hypothetical fault is to account for the lower 700 feet of conglomerate in the McCartney well, the base of the upper Puente sandstone should be 700 feet lower in this well, not 700 feet higher. Invoking facies changes or sudden flexures in folding between the two wells does not make the problem easier to solve.

Pass and Covina Fault. The Pass and Covina fault is another example of a fault whose existence can scarcely be doubted, but whose details are difficult to work out. Its location is not precisely known, but it seems to be marked approximately by Pass and Covina Road, between the Little Puente and San Jose Hills. The conglomerate beds on the north limb of the Little Puente Hills anticline are laterally offset to the south, west of the fault, while the conglomerate on the south limb is offset to the north. This indicates that the western block is downthrown. This fault will be discussed further under the heading *Oil prospects,* in connection with the explanations for the accumulation of oil in the eastern Little Puente Hills.

Minor Faults. Favorable exposures often show minor faulting which would otherwise pass unnoticed. Most of the faults so revealed have displacements measured in a few inches or feet and are therefore unimportant in the general picture. No attempt has been made to show any of these faults on the geologic map.

OIL PROSPECTS

Oil Wells. The western San Jose Hills have been explored for oil since about 1917. The exploration work has been done largely by small independent companies, but Shell Oil Company, Richfield Oil Corporation, The Texas Company, and Ohio Oil Company have each drilled one or two wells. The Bardeen Oil Company which has done the most drilling, has six wells in the area.

Table 3 is a brief summary of the wells drilled in the Little Puente and western San Jose Hills. Records of some of the older wells are incomplete, and the information listed for these is only fairly reliable.

Production. Most of the wells have been commercially unproductive, though many of them have found small amounts of oil and gas. The Bardeen Oil Company's No. 1 (Crittenden) well, drilled in 1922, which produced 1600 barrels, and the same company's Lautenbach well, drilled in 1948, are the only two wells with any appreciable production record. Both of these wells were drilled in the Little Puente Hills, on the crest of the Little Puente Hills anticline.

Table 3. List of oil wells in western San Jose Hills and Little Puente Hills

No.	Operator	Well	Year begun	Year aband.	Elev.	Total depth	Remarks
1.	Bardeen Oil Co.	No. 1	1922	1927	535	4095	TP 1600 bbls. from 1900'. Also known as Crittenden well.
2.	Bardeen Oil Co.	No. 2	1925?	?	438	1645	Also known as Didier or Pass-Covina well.
3.	Bardeen Oil Co.	No. 3	1925	1928	500	2250	Also known as Mallery well.
4.	Bardeen Oil Co.	Puente No. 1	1930	1930	450	5001	Good core record. Dev. 1150' from vert.
5.	Bardeen Oil Co.	Puente No. 2	1930	1931	635	3000	Also known as Bernadette well. Good core record.

6. Bardeen Oil Co.	Lautenbach	1948		475		Prod. from 1500′.
7. D & B Oil Co.	No. 1	1926	1932	390	4520	
8. C.C.M.O. Oil Co.	Sentous No. 1	1917	1918?	610	3953	
9. J. C. Drilling Co.	Kelso No. 1	1939?		525	3505	Electric log.
10. Julian & Criswell	Koch Community No. 1	1936		625	2965	Cored 810-2460; 2700-2730.
11. McCartney, C. E.	Hurley No. 1	1943?		575	3259	Electric log. Good cores below 2000.
12. McVicar-Rood	Sentous No. 1	1936	1936	620	3050	Good cores; good oil showings.
13. Ohio Oil Co.	Legrand No. 1	1944		1068	6141	Good cores; no oil showings.
14. Rancho de la Puente Oil Co.	No. 1	1923		540	4416	
15. Richfield Oil Corp.	Didier No. 1	1928?		491	4480	Probably drifted from vertical.
16. Shell Oil Co.	Garnier No. 1	1942	1942	403	4591	Electric log, good cores.
17. Shell Oil Co.	Sentous No. 1	1920	1921	1162	3652	No oil showings.
18. Taso Oil Co.	No. 1			540		
19. The Texas Co.	Garnier No. 1	1944	1945	1180	7143	Good cores; no oil showings.

Conditions for Oil Accumulation. The western San Jose Hills are on the margin of the late Tertiary Los Angeles Basin and have a thinner and coarser series of sediments than the oil-producing regions near the center of the basin. Most of the Pliocene sediments, which are of such great importance as reservoir rocks in the large oil fields in the basin, have been eroded off the western San Jose Hills. Any oil accumulation is therefore restricted to sands and broken shales in the upper and middle Miocene.

The structural conditions for oil accumulation are fairly favorable. The Little Puente Hills anticline is closed on the west and on the east. The western part of the anticline is cut off from the eastern end by the north-trending Pass and Covina fault, which has dropped the west block. This may account for the production in the Bardeen Oil Company's Crittenden and Lautenbach wells, and the lack of production in the wells to the east of the fault. The producing horizons are confined mainly to the basal sandstone of the upper member of the Puente formation. This sandstone is probably faulted against impervious rocks at the Pass and Covina fault. The sandstone crops out east of the Pass and Covina fault, though the outcrop thickness is considerably less than the thickness encountered in the Bardeen Pass and Covina well just west of the fault. Lensing of the sandstone is probably responsible for some showings in the wells east of the fault.

Promising oil and gas showings were found in thick sands of the lower Puente in the McVicar-Rood Sentous No. 1 well, and to a lesser degree in the Julian and Criswell Koch Community No. 1 well, on the eastern part of the Little Puente Hills anticline. Low permeability of the sands probably accounted for the lack of production in these wells.

The San Jose anticline has been tested by four wells in the mapped area. The Shell Oil Company's Garnier No. 1 well encountered a small amount of sand, probably at the base of the upper Puente, at a depth of about 3800 feet. The Shell Sentous No. 1, The Texas Company Garnier No. 1, and the Ohio Legrand No. 1 farther east all started in lower Puente and found only minor sands in the lower Puente member and Topanga formation. It is not likely that commercial quantities of oil will ever be found on the San Jose anticline, but it is possible that some oil has accumulated south of the San Jose fault at the eastern end of

Table 4. San Jose Hills Foraminifera Localities Determined by Manley L. Natland

Locality	Description
F1	13,140 ft. N, 1,000 ft. W of S.E. corner of Puente quadrangle; in a ravine at an elevation of 680 ft., San Jose Hills. Most of sample *Globigerina bulloides*; some *Bolivina californica* (?). Probably lower Mohnian.
F2	5,130 ft. N, 2,400 ft. W of S.E. corner of Puente quadrangle; on east side of hill 501, at an elevation of 435 ft., San Jose Hills. *Bolivina sinuata, Buliminella curta, Globigerina bulloides, Discorbinella valmonteensis.* Not older than top of lower Mohnian, probably upper Mohnian.
F3	14,270 ft. N, 1,720 ft. W of S.E. corner of Puente quadrangle; on dirt road, at an elevation of 690 ft., San Jose Hills. *Globigerina bulloides, Buliminella subfusiformis, Bolivina vaughani, Bolivina californica.* Lower Mohnian.
F4	13,620 ft. N, 1,920 ft. W of S.E. corner of Puente quadrangle; on dirt road, at an elevation of 600 ft., San Jose Hills. Sample is probably at least as old as upper Mohnian.
F5	13,460 ft. N, 2,080 ft. W of S.E. corner of Puente quadrangle; on dirt road, at an elevation of 575 ft., San Jose Hills. *Globigerina bulloides* abundant, *Bolivina vaughani, Bolivina* sp. Probably at least as old as upper Mohnian.
F6	7,660 ft. N, 1,750 ft. W of S.E. corner of Puente quadrangle; at an elevation of 600 ft., San Jose Hills. *Bolivina vaughani, Globigerina bulloides, Buliminella subfusiformis, Bolivina californica.* Lower Mohnian.
F7	3,410 ft. E, 17,750 ft. N of S.W. corner of Covina quadrangle; in a ravine, at an elevation of 750 ft., San Jose Hills. *Bulimina uvigerinaformis, Buliminella curta.* Lower Mohnian.
F8	15,550 ft. N, 2,930 ft. E of S.W. corner of Covina quadrangle; at an elevation of 1,000 ft., San Jose Hills. *Bolivina californica*, et al. Probably lower part of lower Mohnian.
F9	16,320 ft. S, 10,430 ft. E of N.W. corner of Covina quadrangle; on the San Jose Hills Road, at an elevation of 730 ft. Lower Mohnian.
F10	15,920 ft. N, 1,400 ft. W of S.E. corner of Puente quadrangle; in a ravine, at an elevation of 600 ft., San Jose Hills. *Bolivina sinuata, Bolivina californica, Bolivina woodringi, Bolivina advena, Globigerina bulloides.* Lower Mohnian.
F11	12,040 ft. N, 2,100 ft. E of S.W. corner of Covina quadrangle; in a small ravine, at an elevation of 900 ft., San Jose Hills. Mostly *Bulliminella curta*; usually lower Mohnian.
F12	4,570 ft. N, 7,400 ft. E of S.W. corner of Covina quadrangle; at an elevation of 550 ft., San Jose Hills. *Discorbinella valmonteensis.* Probably upper Mohnian.
F13	13,420 ft. N, 1,690 ft. E of S.W. corner of Covina quadrangle; on dirt road, at an elevation of 1,100 ft., San Jose Hills. *Globigerina bulloides, Bolivina vaughani.* Nothing diagnostic.

F14 13,800 ft. N, 14,110 ft. E of S.W. corner of Covina quadrangle; at an elevation of 850 ft., San Jose Hills.
Bolivina californica, Uvigerina hootsi.
Lower Mohnian.

F15 13,200 ft. N; 12,580 ft. E of S.W. corner of Covina quadrangle; at an elevation of 735 ft., San Jose Hills.
Uvigerina perigrina, Uvigerina hootsi, Planulina ornata, Bolivina sinuata (small), *Valvulineria arikana, Cassidulina aff. crassa.*
Probably lower Mohnian.

F16 13,160 ft. N, 980 ft. W of S.E. corner of Puente quadrangle; about 35 ft. N.E. of locality F1, San Jose Hills.
Bulimina uvigerinaformis (small), *Bolivina californica, Pulvinulinella gyroidinaformis, Suggrunda pygmaea, Globigerina bulloides.*
Lower Mohnian.

F17 11,850 ft. N, 4,280 ft. W of S.E. corner of Puente quadrangle; at an elevation of 620 ft., San Jose Hills.
Upper Mohnian.

F18 14,210 ft. N, 1,600 ft. W of S.E. corner of Puente quadrangle; on dirt road, at an elevation of 700 ft., San Jose Hills.
Globigerina bulloides (most of sample), *Globorotalia canariensis, Bolivina vaughani.*
Nothing diagnostic, but probably lower Mohnian.

F19 9,400 ft. N, 13,270 ft. W of S.E. corner of Puente quadrangle; at an elevation of 480 ft., Little Puente Hills.
Textularia sp. "*flinti*," *Robulus cushmani, Bolivina spissa, Bolivina sinuata* (large), *Uvigerina peregrina, Pulvinulinella pacifica, Cassidulina californica, Cassidulina "crassiformis," Cassidulina cushmani, Cassidulina translucens, Pullenia quinqueloba, Cibicides* sp. "*cicatricosa*" (?).
Top of lower Pico.

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IRONSTONE CONCRETIONS AND BEACH RIDGES OF SAN DIEGO COUNTY, CALIFORNIA

By K. O. Emery[*]

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ABSTRACT

Ironstone concretions are very abundant in sands of beach ridges in San Diego County but are absent in the intervening areas. The ridges appear to be transverse sand dunes that accumulated along shorelines of the sea when it retreated from the Linda Vista terrace. The concretions formed after some weathering had occurred but before streams had dissected the ridges.

INTRODUCTION

Since first encountering them in 1937, the writer has been interested in the nature and origin of the ironstone concretions that are very abundant locally in San Diego County, California. An early but brief description of the concretions was given by Fairbanks.[1] Later, Scott,[2] Hanna,[3] and Hertlein and Grant[4] also mentioned them in reports on the geology of parts of the county. Whenever time permitted, the writer made intermittent investigations in order to learn whether or not the concretions were related to a former marine environment during an earlier

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[*] University of Southern California, Los Angeles, California. Manuscript summitted for publication September 8, 1949.

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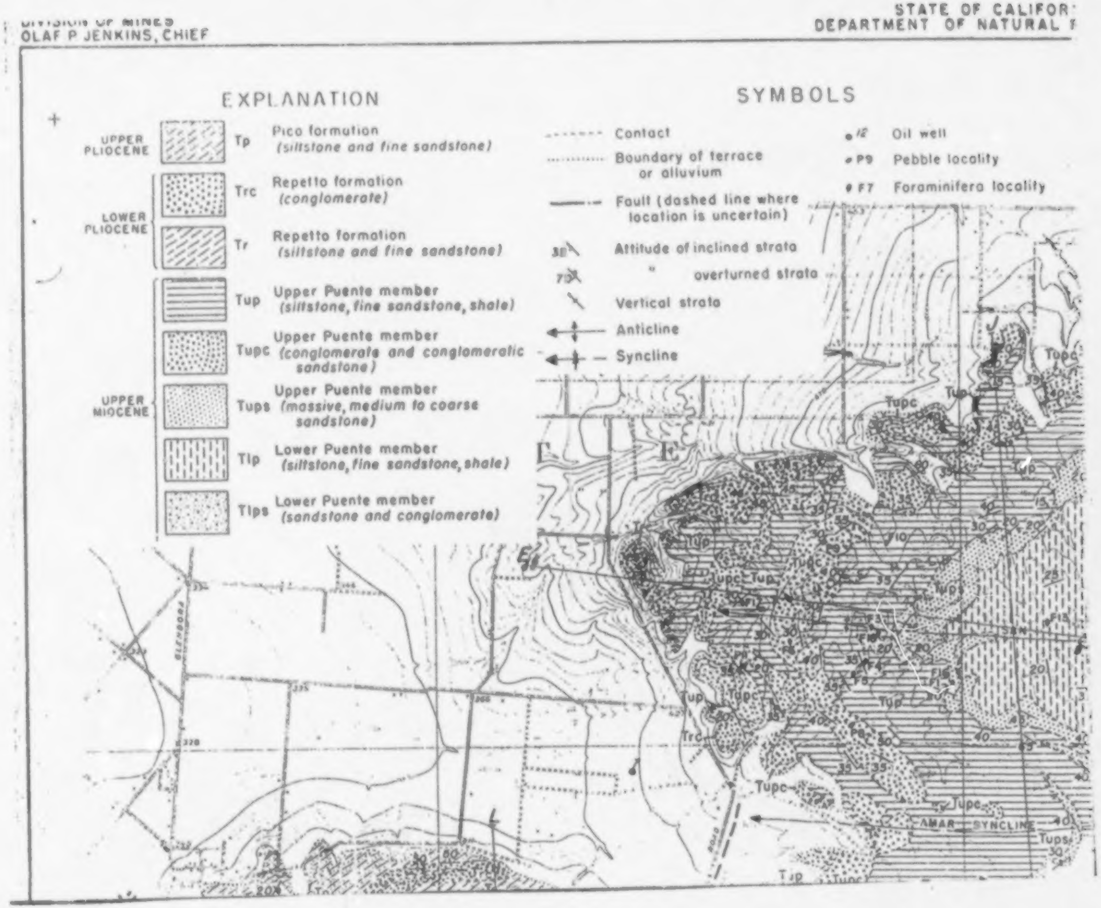
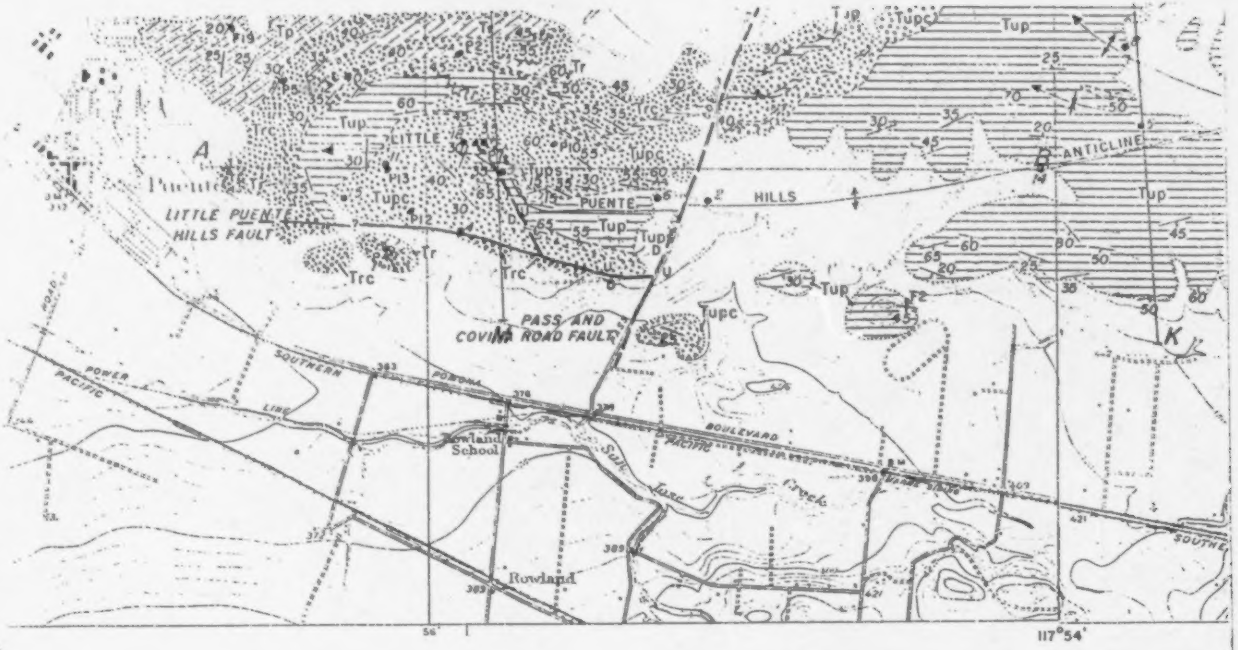

DIVISION OF MINES
OLAF P JENKINS, CHIEF
STATE OF CALIFOR
DEPARTMENT OF NATURAL
EXPLANATION
UPPER PLIOCENE
Tp Pico formation (siltstone and fine sandstone)
LOWER PLIOCENE
Trc Repetto formation (conglomerate)
Tr Repetto formation (siltstone and fine sandstone)
UPPER MIOCENE
Tup Upper Puente member (siltstone, fine sandstone, shale)
Tupc Upper Puente member (conglomerate and conglomeratic sandstone)
Tups Upper Puente member (massive, medium to coarse sandstone)
Tlp Lower Puente member (siltstone, fine sandstone, shale)
Tlps Lower Puente member (sandstone and conglomerate)
SYMBOLS
Contact
Boundary of terrace or alluvium
Fault (dashed line where location is uncertain)
Attitude of inclined strata
" overturned strata
Vertical strata
Anticline
Syncline
Oil well
Pebble locality
Foraminifera locality
Tupc
Tup
Tups
Tlp
Trc
AMAR SYNCLINE


LITTLE PUENTE HILLS FAULT
PASS AND COVINA ROAD FAULT
ANTICLINE
LITTLE
PUENTE
HILLS
Puente
Tup
Tupc
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Trc
Tr
Tp
A
B
K
SOUTHERN PACIFIC
POWER LINE
POMONA BOULEVARD
San Jose Creek
Rowland School
Rowland
ROAD
56'
117°54'

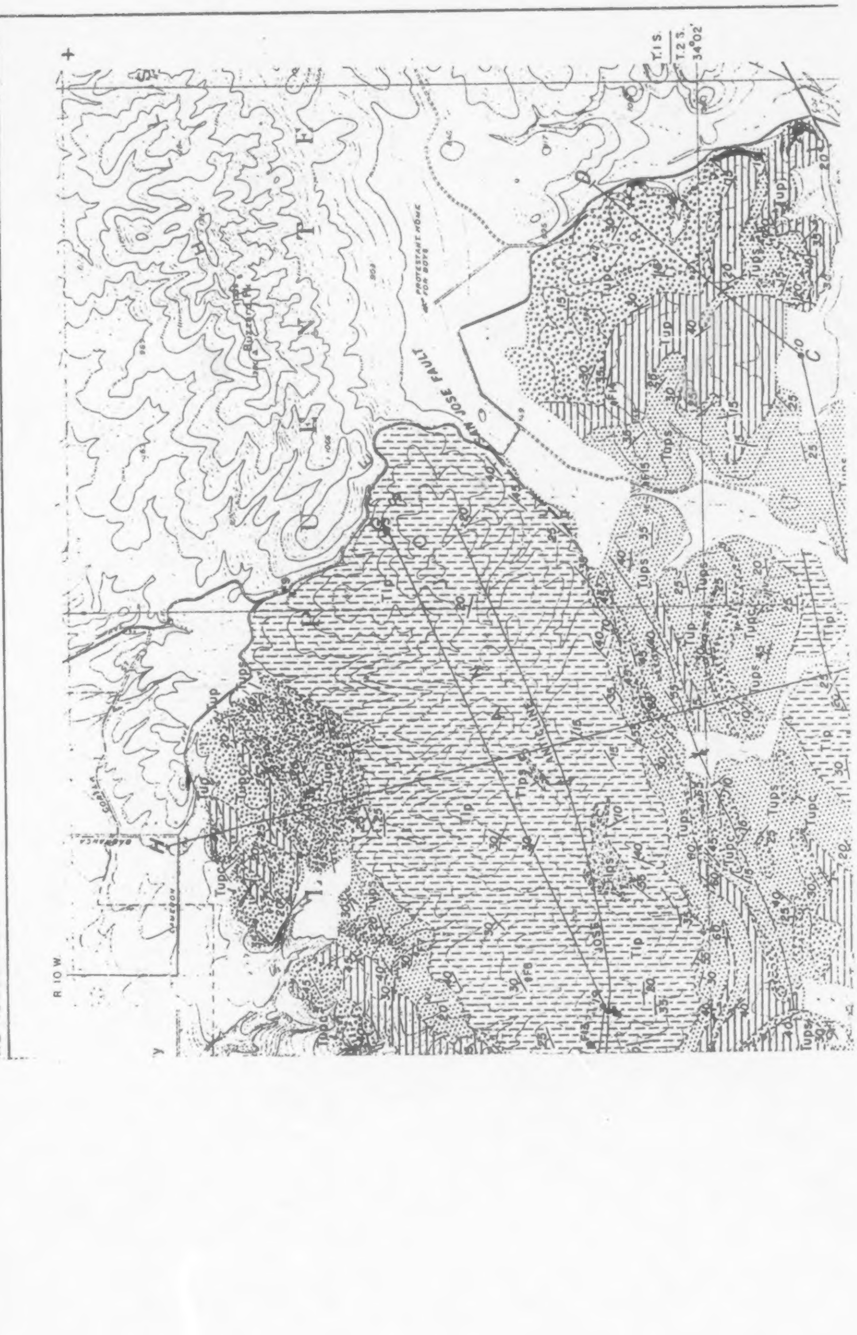
GEOLOGIC MAP OF THE WESTERN SAN JOSE HILLS, L

Scale [illegible]

5000
4000
3000
2000
1000
0

Contour interval 5 feet and 25 feet (see diagram

Datum is mean sea level


SAN JOSE FAULT
PROTESTANT HOME FOR BOYS
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T.2 S.
34°02'
R 10 W.
Tups
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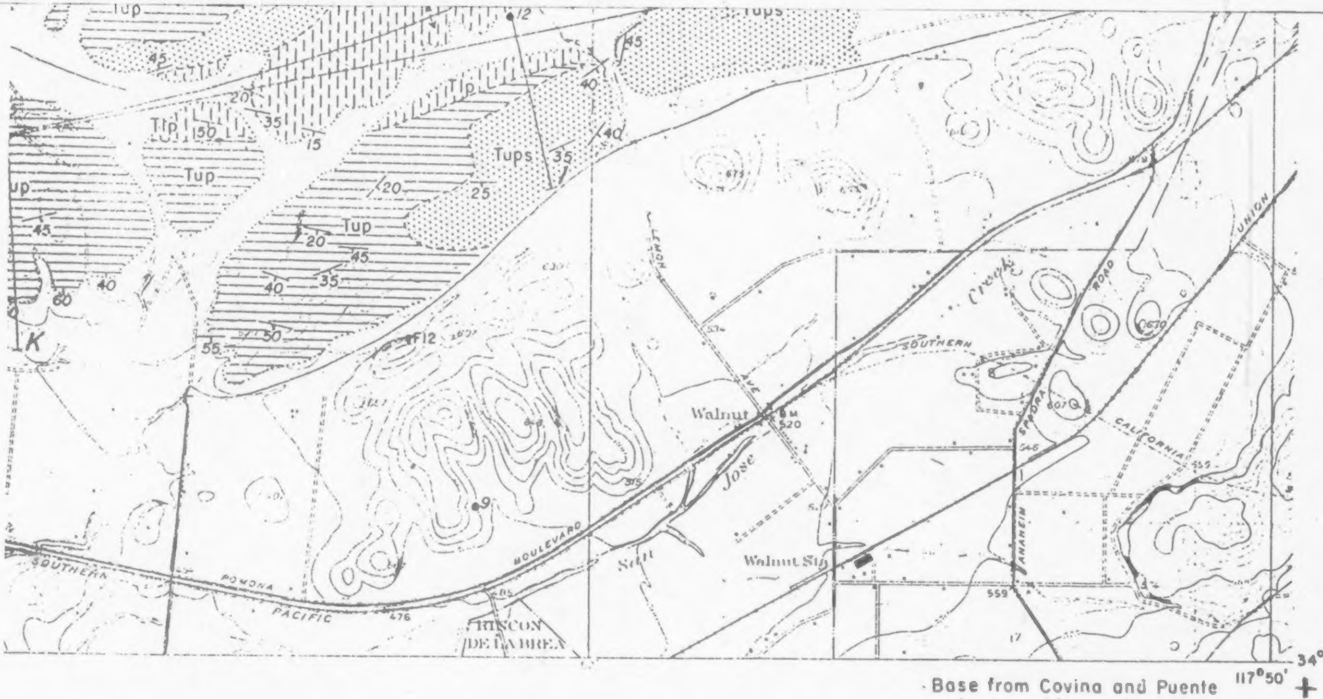
Tup
Tip
C
H


Tup
Tups
Tip
Tip
Tup
Tups
Tup
Tup
up
K
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20
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15
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60
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12
F12
9
Walnut
Walnut Sta
Jose
San
Creek
LEMON
AVE
BOULEVARD
POMONA
PACIFIC
SOUTHERN
SOUTHERN
SPADRA
ROAD
CALIFORNIA
UNION
ANAHEIM
RINCON DE LA BREA
BM 520
476
559
34°00'
117°50'

Base from Covina and Puente
topographic quadrangles
Geology by F. H. Olmstead 1948

LS, LOS ANGELES COUNTY, CALIFORNIA

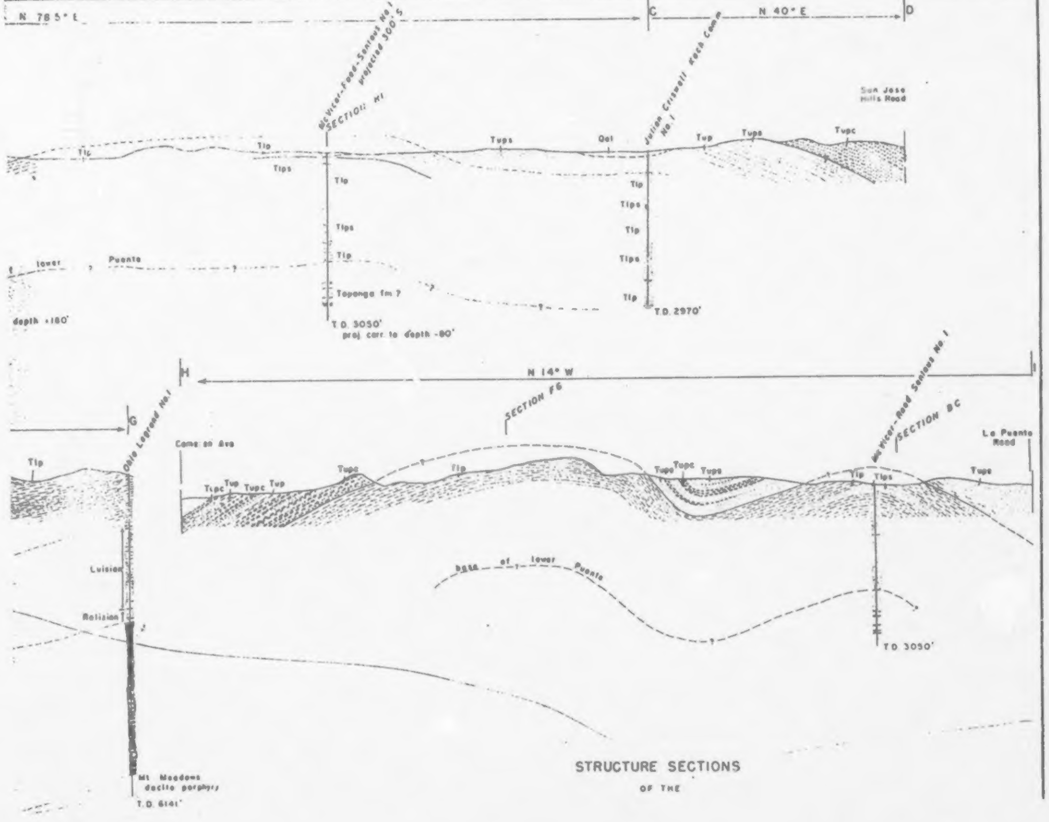
1 Mile

5,000 Feet

see diagram)

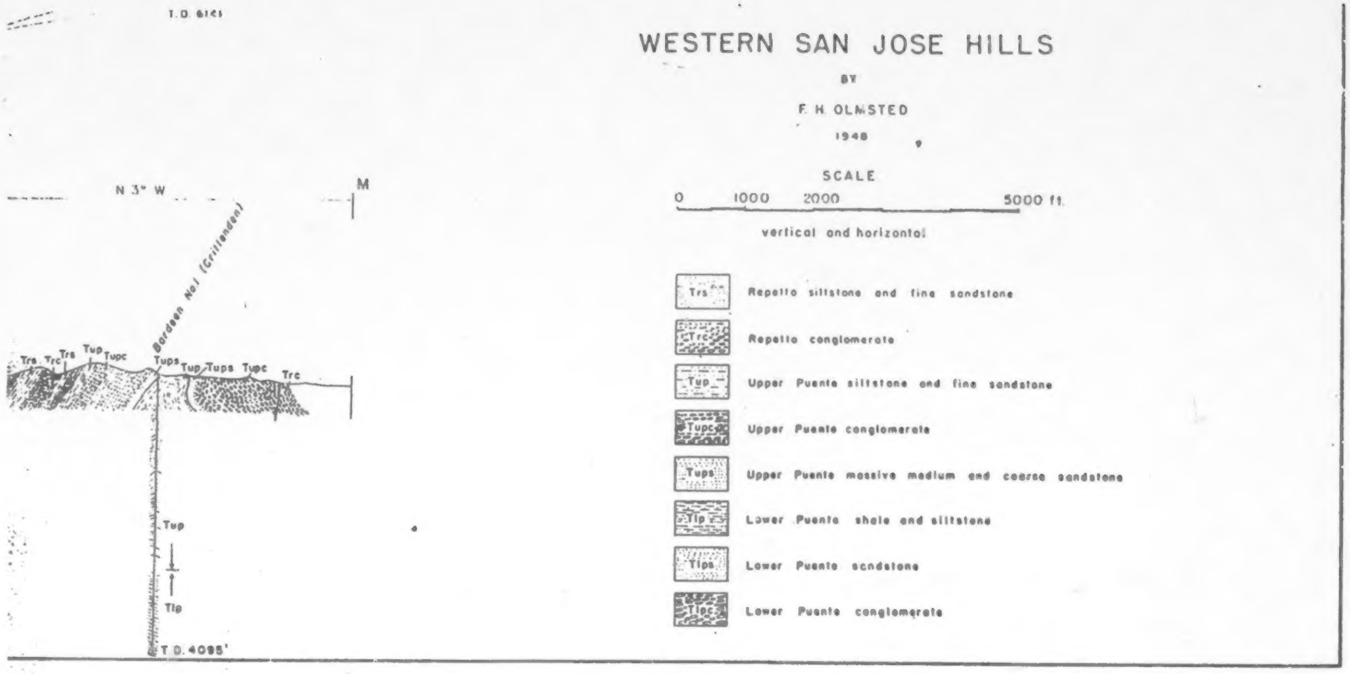
LIFORNIA
TURAL RESOURCES

JOURNAL
VOLUME 46 PLATE 24



STRUCTURE SECTIONS
OF THE

N 78.5° E
C
N 40° E
D
McVicar-Food-Santous No. 1
projected 300' S
SECTION H1
Julian Criswell Koch Comm
No. 1
San Jose
Hills Road
Tlp
Tlp
Tlps
Tups
Qal
Tup
Tups
Tupc
Tlp
Tlps
Tlp
Topanga fm ?
T.D. 3050'
proj corr to depth -80'
Tlp
Tlps
Tlp
Tlps
Tlp
T.D. 2970'
lower
Puente
depth +180'
H
N 14° W
I
SECTION F6
G
Oslo Legrand No. 1
Tlp
Luisian
Relizian
Mt. Meadows
dacite porphyry
T.D. 6141'
Camino Ave
Tupc
Tup
Tupc
Tup
Tupc
Tlp
Tups
Tupc
Tups
McVicar-Reed Santous No. 1
SECTION BC
La Puente
Road
Tlp
Tlps
Tups
base of lower Puente
T.D. 3050'


WESTERN SAN JOSE HILLS
BY
F. H. OLMSTED
1948
SCALE
0 1000 2000 5000 ft.
vertical and horizontal
Trs Repetto siltstone and fine sandstone
Trc Repetto conglomerate
Tup Upper Puente siltstone and fine sandstone
Tupc Upper Puente conglomerate
Tups Upper Puente massive medium and coarse sandstone
Tlp Lower Puente shale and siltstone
Tlps Lower Puente sandstone
Tlpc Lower Puente conglomerate
T.D. 6141
N 3° W
M
Bardeen No. 1 (Crittenden)
Trs
Trc
Trs
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Tupc
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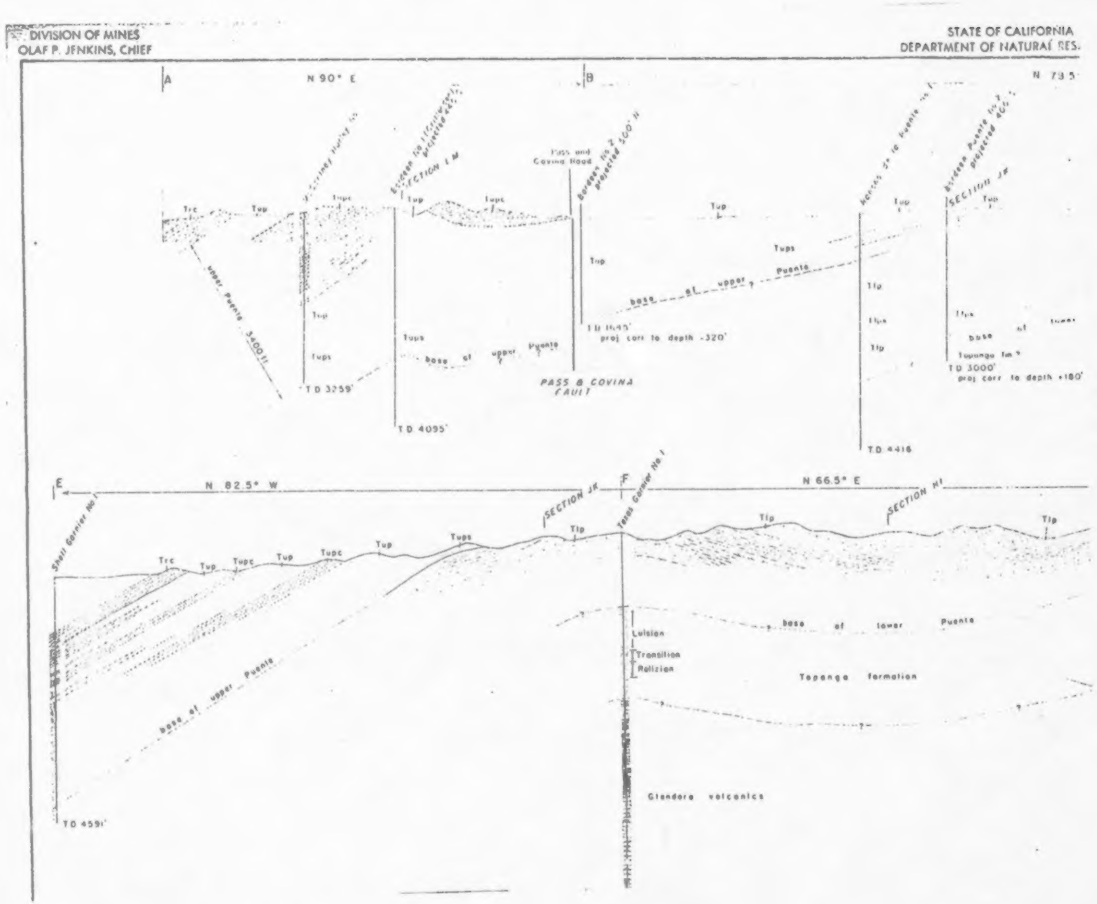
Tup
Tups
Tupc
Trc
Tup
Tlp
T.D. 4095'


DIVISION OF MINES
OLAF P. JENKINS, CHIEF
STATE OF CALIFORNIA
DEPARTMENT OF NATURAL RES.
A
N 90° E
B
N 73.5°
Pass and Covina Hood
Bordeen No 2 projected 500' N
SECTION LM
Bordeen Puente No 1 projected 400'
SECTION JK
Trc
Tup
Tupc
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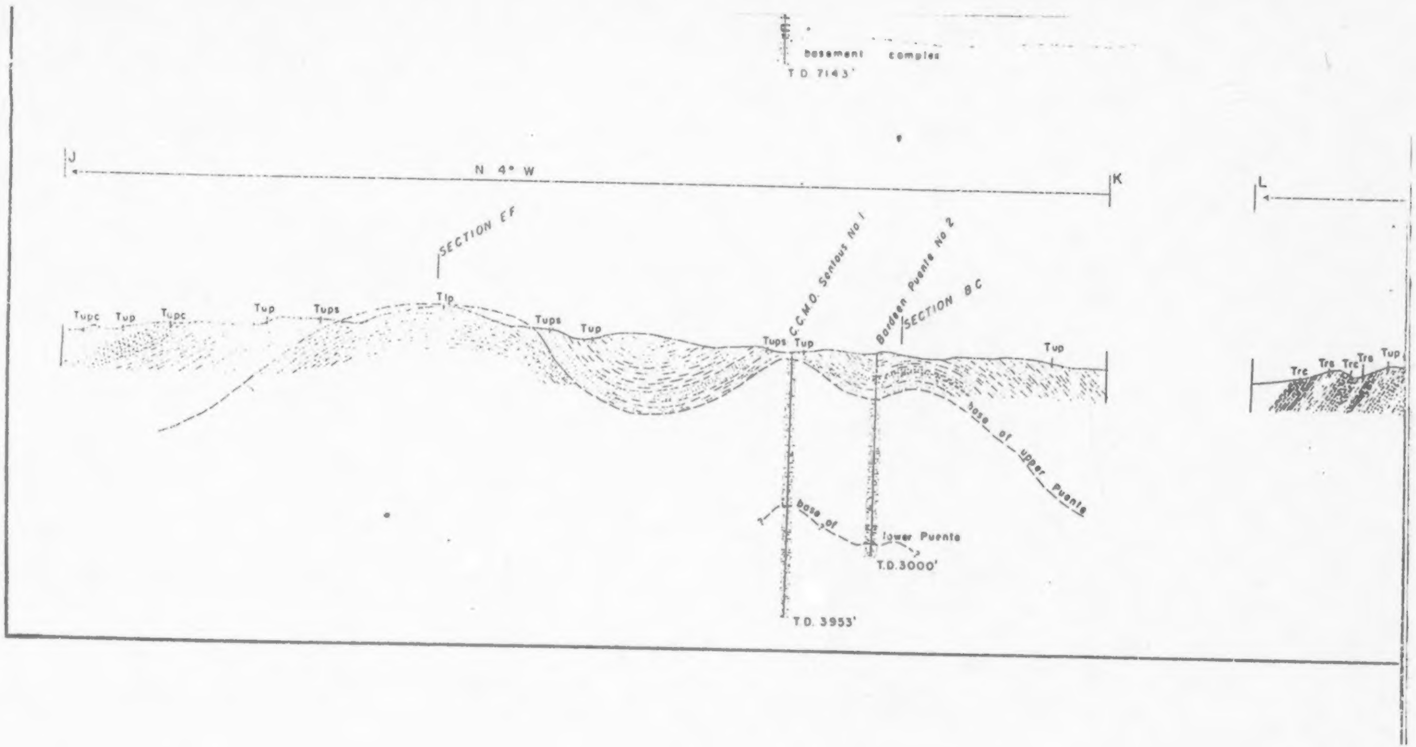
Tlp
Tlps
upper Puente 3400 ft
base of upper Puente
T D 3259'
T D 4095'
T D 1645'
proj corr to depth -320'
PASS & COVINA FAULT
T D 4416
base of lower
Topanga fm ?
T D 3000'
proj corr to depth +180'
E
N 82.5° W
Shell Garnier No 1
SECTION JK
F
Texas Garnier No 1
N 66.5° E
SECTION HI
Trc
Tup
Tupc
Tups
Tlp
base of upper Puente
T D 4591'
Luisian
Transition
Relizian
base of lower Puente
Topanga formation
Glendora volcanics


basement complex
T D 7143'
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N 4° W
K
L
SECTION EF
C.C.M.O. Sentous No 1
Bardeen Puente No 2
SECTION BC
Tupc
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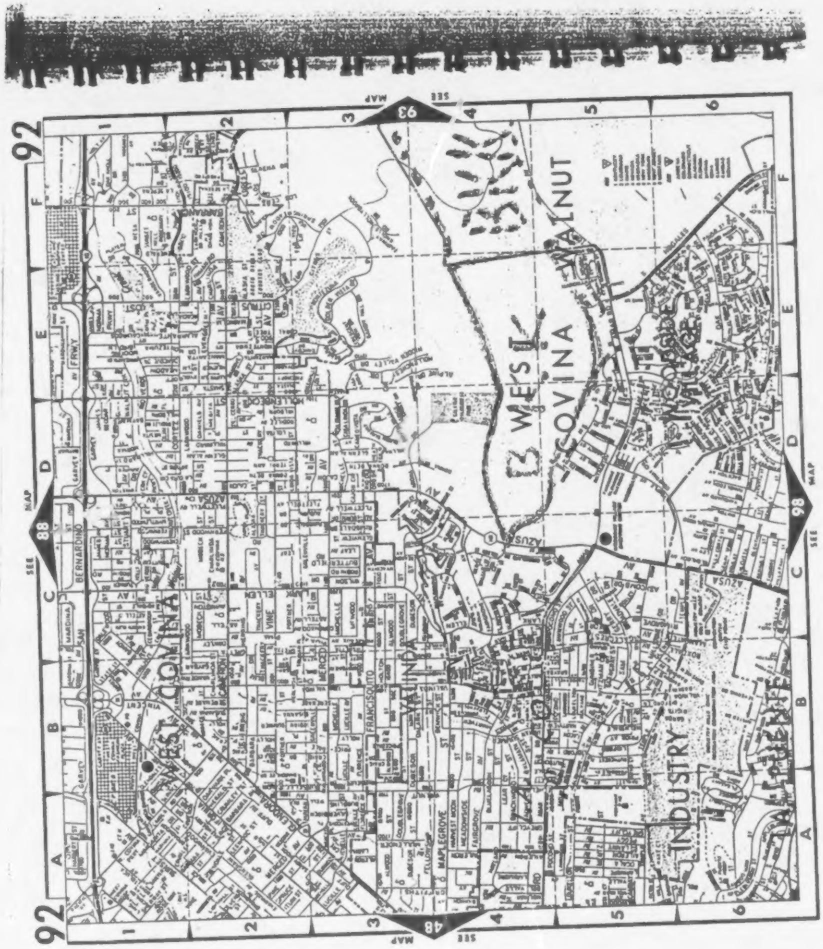
base of upper Puente
base of lower Puente
T.D.3000'
T.D. 3953'


92
WEST COVINA
VALINDA
WEST COVINA
WALNUT
INDUSTRY
LA PUENTE
SEE MAP 88
SEE MAP 93
SEE MAP 98
SEE MAP 48
BERNARDINO
A
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C
D
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5
6

Mr. **Skelton**. Thank you, sir.

Mr. Torres.

Mr. **Torres**. Thank you, Mr. Chairman. As you are probably aware, these two groups that are here before us are my constituents. I have dealt with them and worked with them over the period of my tenure as a Congressman and so I would like to defer to you to ask questions of them and better inform yourself on behalf of the subcommittee as to what areas of concern they have.

Mr. **Skelton**. Each of you brings it home literally to the purpose of our hearing. In economy, a small business is really a means of supporting a family and we are here, of course, looking at the small business aspects of it, and each of you brings home the real basis for our being here today.

Ms. Rodriguez' comments are most disturbing to me when she speaks of fears of small children. I appreciate the forthrightness in bringing this message to each of you: Father and Mr. Bocetta, Mr. Walsh, Mr. Whisenhunt. I wish we had a magic wand to make it all well. We don't. The best we can do is find the facts and take it to the legislative process, which is, as all of you know, difficult, cumbersome, but it works. For 200 years it has worked and I really don't have questions of you. I have an appreciation not just for your testimony, but for your expressing your hearts and your minds. This means more to me and will have an everlasting impression on me as a Congressman and as a person. Thank you.

We have one more panel and it looks like I am going to be able to make it without having to leave and impose on your kindness.

Thank you all very much.

Mr. **Torres**. Thank you.

Mr. **Skelton**. If the city of West Covina, the mayor, and his city departments would step forward, please.

Mr. Mayor, as you know, we are under a time constraint. We are running according to schedule. I would ask that you introduce the other gentlemen with you and then, Mayor Chappel, I will ask you to proceed.

PANEL CONSISTING OF KEN CHAPPELL; AND REV. FRED LANDSBERG

TESTIMONY OF KEN CHAPPELL, MAYOR, CITY OF WEST COVINA, CALIF.; ACCOMPANIED BY COLIN LENNARD, CITY ATTORNEY; MICHAEL MILLER, DIRECTOR OF ENVIRONMENTAL SERVICES; AND CRAIG MEACHAM, CHIEF OF POLICE, CITY OF WEST COVINA, CALIF.

Mr. **Chappell**. Yes, Congressman Skelton and Congressman Torres. I am Ken Chappell, mayor of the city of West Covina. With me today is Pastor Fred Landsberg, representing our citizens' task force, transition task force; Colin Lennard, our city attorney; Michael Miller, director of environmental services; and Craig Meacham, our chief of police.

I am here to discuss with you the concerns expressed by many owners of small businesses about the effects of the BKK landfill on those of us who must live and work in West Covina.

Since 1980, the city of West Covina has been in the forefront of attempts to resolve an issue which is bigger than the city of West

Covina. Hazardous waste disposal is a regional, statewide and national problem, and since 1980, the city of West Covina has conducted reams of studies in an effort to formulate a solution to the overall problem of hazardous waste management.

In 1980, we issued a position paper on hazardous waste management and since then have been trying to achieve the goals set forth in that paper.

Here are some of the things we have done: In 1981, we established a task force composed of citizen representatives and State officials. The task force has as its goal the phasing out of the landfill disposal of hazardous waste at BKK within 5 years. With partial funding from the State, we have established a traffic control and truck monitoring program in order to insure that hazardous waste haulers comply with all safety laws. We have formulated a spill response plan second to none in the State. We have coordinated spill response with the county and State agencies so that cleanup efforts are speedy and effective.

We have developed contingency plans to protect West Covina residents in case spills cannot be immediately contained. We are trying to secure State legislation to let us banish unsafe hazardous waste trucks from West Covina streets and to let us regulate the licensing and training of drivers who handle toxic and hazardous materials.

We are trying through the courts to increase fines and penalties for hazardous waste haulers who dispatch mechanically unsafe trucks. But reacting to spills does not solve the problem. The solution to the problem is addressing and facing headon the methods whereby hazardous wastes can better be handled. We urge this committee to push for the following solutions:

Acceleration of waste treatment technology to develop means to reduce hazards inherent in the landfill dumping of untreated wastes.

Development of a waste collection system for small businesses, such as printshops, metal shops, and drycleaners, who collectively produce enormous amounts of hazardous waste. Financing is needed to establish a collection point at which hazardous waste material can be catalogued and transported to a treatment facility.

Help in finding new sites for landfill disposal of hazardous waste. The Southern California Hazardous Waste Management Project, of which we are a part, has been barred from U.S. military lands to search for possible sites for transfer stations, treatment facilities, and landfills.

Since 2 to 4 percent of the hazardous wastes entering BKK originate in military installations, we think the Federal Government has an obligation to help us find new sites. We ask this committee to take action to open Federal lands and military reservations to those who are seeking new hazardous waste treatment and disposal sites in Southern California.

We in West Covina do not believe that landfills belong in an urban environment. Furthermore, we do not believe that urban West Covina should be the receiving ground for wastes generated by industries in other jurisdictions.

We implore Federal and State officials to find new sites, remote from people, for landfills. We implore Federal and State officials to find the money and expertise to develop new waste treatment technologies. In the meantime, we in West Covina will continue to do all we can to protect residents of West Covina from the continued intrusion of hazardous and toxic wastes into our city.

Mr. Chairman, that concludes my comments and I have my staff here to answer any questions that you might ask us at this time.

One more thing. Fred Landsberg of our transition task force does have comments.

[Additional information received from Mr. Chappell follows:]

OFFICE OF THE MAYOR,
West Covina, Calif., May 24, 1983.

Hon. IKE SKELTON,
Chairman, House of Representatives, Committee on Small Business, Subcommittee on Energy, Environment, and Safety Issues Affecting Small Business, Washington, D.C.

DEAR MR. SKELTON: In response to your letter of May 3rd regarding your upcoming hearing on the operations of the BKK Landfill and its effects on small business in the area, the following information is provided:

1. The regulatory authority of the City of West Covina over the operations of the BKK Landfill is governed by Unclassified Use Permit No. 71, adopted in 1976 (Attachment No. 1). Regulation of this permit is further restricted by provisions of Section 25229 of the California Health and Safety Code, as well as a court judgment issued on January 22, 1983 (Attachment No. 2).

2. Relative to the actions taken by the City with respect to spills on Azusa Avenue, the City has developed a spill response plan for implementation at such time as spills occur (Attachments No. 3 and No. 4). The City has actively trained its personnel and developed a coordinated system with other State and County agencies to aid our effectiveness in responding to spills. We do not believe that any other city has been more effective in responding to hazardous waste spills. We are constantly attempting to improve our procedures.

In addition to the above, the City has supported State legislation to bring the cost of spilling hazardous wastes so high that the penalty can no longer be considered "just a normal cost of doing business." We have actively cooperated with the California Highway Patrol in performing commercial vehicle inspections which, again, promote an awareness by the transporters of these wastes of the need to maintain their equipment. Much of the real authority to improve this condition lies with the State of California, although pending legislation may give the City of West Covina Police Department more authority in this area. We wholeheartedly support any efforts to make the transportation of hazardous wastes and materials more conducive to the health and safety of the public.

3. Enclosed please find a list of every study conducted or commissioned by the City on the effects of the operations of the BKK Landfill on small business and the residents (Attachment No. 5). The list of these studies highlights the extensive effort put forward by the City to try to find a solution to these impacts. Pursuant to your request, we are not only listing these studies and reports, but we are sending you a copy of each, under separate cover.

4. The evacuation plan for the purpose of dealing with potential reactions to hazardous waste spills in the City of West Covina is attached (Attachment No. 4). It has taken some time to refine this plan, in light of the other jurisdictions that are involved. We are in the process of developing a procedure that will be disseminated to the small businesses and residents in the vicinity of Azusa Avenue in order to give them a better understanding of what they should do in the event of a spill and possible evacuation.

We hope the above information is sufficiently responsive to your request. If you desire further information or have some questions, please feel free to contact my office or call Mike Miller, Environmental Services Director, at (213) 962-8631, extension 201.

Sincerely yours,

KENNETH I. CHAPPELL, *Mayor.*

Mr. SKELTON. Fine. Mr. Landsberg.

TESTIMONY OF REV. FRED LANDSBERG, REPRESENTING THE COMMUNITY REPRESENTATIVES TO THE BKK LANDFILL HAZARDOUS WASTE DISPOSAL TRANSITION TASK FORCE; ACCOMPANIED BY LOUIS GILBERT, RICHARD LEWIS, AND NANCY MANNERS

Mr. LANDSBERG. Chairman Skelton and Congressman Torres, my name is Rev. Fred Landsberg, and I am one of the community representatives to the BKK landfill hazardous waste disposal transition task force. The other three members are here with me this afternoon; Louis Gilbert, Richard Lewis and Nancy Manners are sitting over here on your right side of the audience towards the front. We are all residents of West Covina and have been dealing with this situation of the BKK landfill operating within our community for a number of years.

The statement that I am about to read this afternoon reflects the composite thoughts of all of the community representatives on the task force.

In 1981, the BKK transition task force was created with the expressed goal of phasing out the land disposal of hazardous waste at the landfill within 5 years or less. Even prior to that time, my fellow representatives and other residents of West Covina resolved to try to eliminate the land disposal of hazardous wastes at the BKK landfill in West Covina. We have been trying for 1½ years to obtain the cooperation of all the parties most interested in and affected by the management of hazardous wastes.

We have set forth some of the problems and discussed some solutions, but have yet to develop a plan. We have attempted to work together with Federal, State and regional agencies in this effort and we have attempted to work with all parties that have any interest in this matter in an effort to solve the problem. We have had absolutely no participation from the chemical industry, although they have been invited to participate from the outset of the work of our task force.

It is extremely frustrating to find that after 1½ years we have progressed very slowly toward our goal, and it appears that the phaseout within 5 years is beyond our current grasp without further assistance from State and Federal agencies. At the outset of our deliberations, we were told that some 500,000 tons of hazardous waste needs to be addressed by some form of waste management, other than being disposed in landfills.

We have since learned that this 500,000 ton figure applied only to the amount of waste generated by industry and disposed in offsite landfills. We have recently been informed by Dr. David Morrell, project manager for the Southern California Hazardous Waste Management Project, that in reality we are actually dealing with an additional 2 million tons of hazardous waste, which heretofore had not been quantified and is currently being handled by industry onsite. Given this figure, and if waste treatment were to amount to 50 percent and be successful in that range, the BKK landfill would, in effect, continue to receive even more tonnage of hazardous wastes than they are receiving to date.

This situation is intolerable to the city of West Covina and its residents. We are concerned that the operation of the BKK landfill impacts in a negative fashion on the normal growth and development of the city and the promotion and development of small business and job opportunities for our residents.

There is no reason, therefore, why we have to continue to be relied on to provide this sole disposal site for the hazardous waste generated in all of southern California.

We have heard of efforts to try to find alternate sites in other jurisdictions. We realize that the political reality of establishing these sites is well beyond our own capability. We have heard Mayor Chappell suggest that perhaps you could assist in finding Federal land for use as a hazardous waste landfill.

Our suggestion, in addition to that, another presented today, would be for this committee to help provide some vehicle whereby a business such as BKK can be encouraged to relocate their operation to other remote locations.

It is our recommendation that land be made available on Federal or State lands that are acceptable from the landfill operational standpoint. This land can be offered, perhaps, to BKK to allow them to transfer their current facility and operations. It is suggested that the Federal Government facilitate the relocation of the current operation and assist in the development of new residual waste sites or landfills. In addition, we request that upon completion of this relocation that the BKK landfill site in West Covina immediately be examined to determine if it meets or exceeds the Federal standards for closure under Federal law.

It is further requested that this site be monitored continuously in perpetuity.

The BKK landfill has been a drag on the West Covina community and small businesses, both financially and physically. The landfill must be removed from this urban setting. The reliance of the producers of hazardous wastes on this single landfill needs to be eliminated.

The Federal, State, and local agencies having authority to address this problem and create the environment for its solution must step forward and make every effort to initiate actions within their authority to solve this problem.

We want to thank this committee for coming to West Covina and receiving input from the community most affected by the operation of the BKK landfill.

I would like to make one additional comment, just kind of off the cuff. I was not here this morning, but I have been informed that you have received, prior to coming here today, the DOHS study on air emissions, which was conducted last fall and to which you may be aware there was a hearing held by DOHS in West Covina on April 7 in order to attempt to answer questions and to assure we residents of the safety of the operation of the landfill.

However, as a result of that meeting, city government here in West Covina and citizens found themselves really with more questions than answers and questions have been submitted to DOHS. We as a task force have written strongly worded letters, along with our city council and, I am sure, our citizens within our community, to the DOHS requesting them to come back and again face the citizens and answer these questions openly and publicly and they have refused to do so heretofore.

We would suggest that the only way to begin to work to solve the problem which we in West Covina face is to have open lines of communication between local, State and Federal government and agencies and the citizenry. Unless these lines of communication are kept open, what we really look forward to facing here unfortunately is a potential and very serious disaster.

Thank you.

[Mr. Landsberg's prepared statement follows:]

PREPARED STATEMENT OF REV. FRED LANDSBERG, REPRESENTING THE COMMUNITY REPRESENTATIVES TO THE BKK LANDFILL HAZARDOUS WASTE DISPOSAL TRANSITION TASK FORCE

CHAIRMAN SKELTON, AND OTHER MEMBERS OF THE COMMITTEE, MY NAME IS FRED LANDSBERG. I AM ONE OF THE COMMUNITY REPRESENTATIVES TO THE BKK LANDFILL HAZARDOUS WASTE DISPOSAL TRANSITION TASK FORCE. I AM BEFORE YOU TODAY TO ACT AS A SPOKESMAN FOR THE REPRESENTATIVES OF THE COMMUNITY ON THE TRANSITION TASK FORCE. THESE REPRESENTATIVES INCLUDE LOUIS GILBERT, RICHARD LEWIS, AND NANCY MANNERS. THE STATEMENT THAT I AM ABOUT TO PRESENT REFLECTS THE COMPOSITE THOUGHTS OF ALL OF THE COMMUNITY REPRESENTATIVES.

IN 1981, THE BKK TRANSITION TASK FORCE WAS CREATED WITH THE EXPRESSED GOAL OF PHASING OUT THE LAND DISPOSAL OF HAZARDOUS WASTE AT THE BKK LANDFILL WITHIN FIVE YEARS OR LESS. EVEN PRIOR TO THAT TIME, MY FELLOW REPRESENTATIVES AND OTHER RESIDENTS OF WEST COVINA RESOLVED TO TRY TO ELIMINATE THE LAND DISPOSAL OF HAZARDOUS WASTES AT THE BKK LANDFILL IN WEST COVINA. WE HAVE BEEN TRYING FOR 1½ YEARS TO OBTAIN THE COOPERATION OF ALL OF THE PARTIES MOST INTERESTED IN AND AFFECTED BY THE MANAGEMENT OF HAZARDOUS WASTES. WE HAVE SET FORTH SOME OF THE PROBLEMS AND DISCUSSED SOME SOLUTIONS BUT HAVE YET TO DEVELOP A PLAN. WE HAVE WORKED TOGETHER WITH FEDERAL, STATE, AND REGIONAL AGENCIES IN THIS EFFORT. WE HAVE ATTEMPTED TO WORK WITH ALL PARTIES THAT HAVE ANY INTEREST IN THIS MATTER IN AN EFFORT TO SOLVE THE PROBLEM. WE HAVE HAD ABSOLUTELY NO PARTICIPATION FROM THE CHEMICAL INDUSTRY, ALTHOUGH THEY WERE INVITED FROM THE OUTSET.

IT IS EXTREMELY FRUSTRATING TO FIND THAT AFTER 1½ YEARS WE HAVE PROGRESSED VERY SLOWLY TOWARDS OUR GOAL, AND IT APPEARS THAT THE PHASE-OUT WITHIN FIVE YEARS IS BEYOND OUR CURRENT GRASP. AT THE OUTSET OF OUR DELIBERATIONS, WE WERE TOLD THAT 500,000 TONS OF HAZARDOUS WASTE NEEDS TO BE ADDRESSED BY SOME FORM OF WASTE MANAGEMENT OTHER THAN BEING DISPOSED OF IN LANDFILLS. WE HAVE SINCE LEARNED THAT THIS 500,000 TON FIGURE APPLIED ONLY TO THE AMOUNT OF WASTE GENERATED BY INDUSTRY AND DISPOSED OF IN OFF-SITE LANDFILLS. WE HAVE RECENTLY BEEN INFORMED BY DR. DAVID MORRELL, PROJECT MANAGER FOR THE SOUTHERN CALIFORNIA HAZARDOUS WASTE MANAGEMENT PROJECT, THAT IN REALITY WE ARE ACTUALLY DEALING WITH AN ADDITIONAL 2 MILLION TONS OF HAZARDOUS WASTE, WHICH HERETOFORE HAD NOT BEEN QUANTIFIED AND IS CURRENTLY BEING HANDLED BY INDUSTRY ON-SITE. GIVEN THIS FIGURE, AND IF WASTE TREATMENT WERE 50% SUCCESSFUL, THE BKK LANDFILL WOULD, IN EFFECT, RECEIVE MORE TONNAGE OF HAZARDOUS WASTES THAN THEY ARE NOW.

THIS SITUATION IS INTOLERABLE TO THE CITY OF WEST COVINA AND ITS RESIDENTS. WE ARE CONCERNED THAT THE OPERATION OF THE BKK LANDFILL IMPACTS IN A NEGATIVE FASHION ON THE NORMAL GROWTH AND DEVELOPMENT OF THE CITY AND THE PROMOTION AND DEVELOPMENT OF SMALL BUSINESS AND JOB OPPORTUNITIES FOR OUR RESIDENTS. THERE IS NO REASON WHY WE HAVE TO CONTINUE TO BE RELIED ON TO PROVIDE A DISPOSAL SITE FOR THE HAZARDOUS WASTE GENERATED IN ALL OF SOUTHERN CALIFORNIA.

WE HAVE HEARD OF EFFORTS TO TRY TO FIND ALTERNATE SITES IN OTHER JURISDICTIONS. WE REALIZE THAT THE POLITICAL REALITY OF ESTABLISHING THESE SITES IS WELL BEYOND OUR CAPABILITY. WE HAVE

HEARD MAYOR CHAPPELL'S STATEMENTS AND HIS SUGGESTIONS ON HOW YOU MAY BE ABLE TO HELP SMALL BUSINESSES AND MAKE FEDERAL LAND AVAILABLE FOR SITING CONSIDERATION. OUR SUGGESTION FOR THIS COMMITTEE IS TO HELP PROVIDE SOME VEHICLE WHEREBY BUSINESSES, SUCH AS BKK, CAN BE ENCOURAGED TO RELOCATE THEIR OPERATION TO OTHER, REMOTE LOCATIONS. IT IS OUR RECOMMENDATION THAT LAND BE MADE AVAILABLE ON FEDERAL OR STATE LANDS THAT ARE ACCEPTABLE FROM THE LANDFILL OPERATIONAL STANDPOINT. THIS LAND CAN BE OFFERED TO THE BKK CORPORATION TO ALLOW THEM TO TRANSFER THEIR CURRENT FACILITY AND OPERATIONS. IT IS SUGGESTED THAT THE FEDERAL GOVERNMENT FACILITATE THE RELOCATION OF THE CURRENT OPERATION AND ASSIST IN THE DEVELOPMENT OF NEW RESIDUAL WASTE SITES OR LANDFILLS. IN ADDITION, WE REQUEST THAT UPON COMPLETION OF THIS RELOCATION, THAT THE BKK LANDFILL SITE IN WEST COVINA IMMEDIATELY BE EXAMINED TO DETERMINE IF IT MEETS OR EXCEEDS THE FEDERAL STANDARDS FOR CLOSURE, UNDER FEDERAL LAW. IT IS FURTHER REQUESTED THAT THIS SITE BE MONITORED CONTINUOUSLY IN PERPETUITY.

THE BKK LANDFILL HAS BEEN A DRAG ON THE WEST COVINA COMMUNITY AND SMALL BUSINESSES, FINANCIALLY AND PHYSICALLY. THE LANDFILL MUST BE REMOVED FROM THIS URBAN SETTING. THE RELIANCE OF THE PRODUCERS OF HAZARDOUS WASTES ON THIS SINGLE LANDFILL MUST BE ELIMINATED. THE FEDERAL, STATE, AND LOCAL AGENCIES HAVING AUTHORITY TO ADDRESS THIS PROBLEM AND CREATE THE ENVIRONMENT FOR ITS SOLUTION, MUST STEP FORWARD AND MAKE EVERY EFFORT TO INITIATE ACTIONS WITHIN THEIR AUTHORITY TO SOLVE THIS PROBLEM.

WE THANK THE COMMITTEE FOR COMING TO WEST COVINA AND RECEIVING INPUT FROM THE COMMUNITY MOST AFFECTED BY THE BKK LANDFILL.

Mr. SKELTON. Thank you. Do we have any other comments from the other gentlemen? Thank you.

Congressman Torres.

Mr. TORRES. Thank you, gentlemen, for coming forth today.

I have just one question. The statements that I have just heard allude to the relocation of a major industry in your city. You have heard from the other small businessmen in the area who also talk of an exodus because of the problem and, obviously, such an exodus will have a monetary effect on your city. How important is the fiscal contribution BKK makes to the city through the payment of a business tax?

Mr. CHAPPELL. How important is it?

Mr. TORRES. Yes.

Mr. CHAPPELL. Well, at the present time it is a sizable sum of money, over $1 million. We feel, and you have heard our testimony, that we can do without that $1 million dollars if it can be possible, if it can be done, but we are utilizing it and we are spending it. It is helping us balance our budget. That is the facts.

Mr. TORRES. No further questions, Mr. Chairman.

Mr. SKELTON. You get $1 million in what kind of tax, Mayor?

Mr. CHAPPELL. Business license tax.

Mr. SKELTON. I see.

Do you have a comment or question?

Mr. ORBAN. Yes, two questions, now.

How much out of your total budget is that $1 million?

Mr. CHAPPELL. Well, the budget we are now working on is $28 million.

Mr. ORBAN. What is your rate of tax to get that? In other words, is that just they pay $1 million dollars to do business, or do you have a rate that you charge them?

Mr. CHAPPELL. We have a 10-percent rate.

Mr. LENNARD. Excuse me, counsel; that is also regulated by the State. It is under State statute. It cannot exceed 10 percent.

Mr. ORBAN. It cannot, and so $1 million is 10 percent of——

Mr. LENNARD. Whatever the gross receipts are.

Mr. ORBAN. 10 percent of their $10 million gross receipts.

I would like to also congratulate you Chief Meacham, and your police, and inform the chairman when we went down to see the spill this afternoon, the police had already cordoned off the area. They had blocked traffic from traveling over the top of the spill until they could determine what it was. They had already, with the help of BKK, found the truck, secured the manifest and were running tests in BKK's office to determine the exact nature of the spill. They seemed to have it very well in hand.

When do you make a determination to go for more help? When do you go to Los Angeles County and say, "Wow, send us your special team?"

Mr. MEACHAM. Well, that depends on how the scenario unwraps. First of all, if it is a sizeable spill—and as you indicated today, it was not—if there is a determination that it is a toxic or hazardous waste, we notify the county health department immediately. In the overlapping responsibilities for the removal of toxic waste spills, we run into a bureaucratic maze, with regard to various jurisdictional responsibilities. We notify the department of health. If we feel that the Los Angeles County Fire Department HAZ/MAT unit can be of any assistance to us in determining the nature of the spill, that we need their specialized equipment or expertise to retrieve samples, we do call them.

Our own fire units that are stationed immediately adjacent to this area. There are two within a half a mile of this particular location which have equipment to deal with the smaller spills, but they do not have the sophisticated equipment that you had submitted in evidence today.

So, depending on how the scenario unwraps, we either call the Los Angeles County HAZ/MAT unit to come out and assist us in entering into the spill site to obtain the samples and then depending where it goes from there, we are at the multi- jurisdictional situation where we need the California Highway Patrol or the Los Angeles county sheriff, who borders our city, we may or may not call them.

Mr. SKELTON. Thank you. If there are no further comments——

Wait! Excuse me, Dr. Simpson.

Dr. SIMPSON. Thank you, Mr. Chairman.

I just have three simple questions. My first one is directed to anybody who can answer it. Do you know what the income would be to West Covina if BKK did not accept hazardous waste, but accepted everything else? And if you don't know, is there some way you could find out?

Mr. CHAPPELL. We will find out, and get the information to you.

Mr. SKELTON. Would you supply that to our subcommittee for the record, please?

Mr. CHAPPELL. Yes, sir, we will.

[The information referred to above follows:]

City of WEST COVINA California
1444 WEST GARVEY AVENUE • 91790 • AREA CODE 213 • 962-8631

August 19, 1983

Honorable Ike Skelton, Chairman
United States House of Representatives
Committee on Small Business
Subcommittee on Energy, Environment,
and Safey Issues Affecting Small Business
H2-569, House Annex 2
Washington, D.C. 20515

AUG 22 1983

Dear Congressman Skelton:

On June 3, 1983, you chaired a fact-finding hearing in West Covina, the purpose of which was to establish a record on the operations of the B.K.K. Landfill and its effects on the small businesses in the area. During the course of this hearing, the City was requested to provide the Subcommittee with the revenue history for the B.K.K. business license in the City of West Covina. The revenue history for the last ten years is as follows:

YEAR	REVENUE RECEIVED
1972-73	$ 500
1973-74	500
1974-75	500
1975-76	500
1976-77	110,957
1977-78	160,457
1978-79	289,269
1979-80	519,264
1980-81	1,239,943
1981-82	1,521,682

The first four years shown are based on a flat rate business license fee. The subsequent year's receipts were based on a percentage of gross receipts calculations. The percentage increased over these years to the current 10% rate. While we do not have the final audit report on revenues, it is expected that the 1982-83 receipts will be approximately the same as 1981-82.

We hope this information meets the Committee's needs. If you desire further information, please call me. Please excuse the late response to your request.

Yours truly,

Michael L. Miller

Michael L. Miller
Environmental Services Director

MLM:ls

cc: City Council
City Manager

City of WEST COVINA California
1444 WEST GARVEY AVENUE • 91790 • AREA CODE 213 • 962-8631

June 16, 1983

Honorable Ike Skelton, Chairman
United States House of Representatives
Committee on Small Business
Subcommittee on Energy, Environment,
and Safety Issues Affecting Small Business
H2-569, House Annex 2
Washington, D.C. 20515

Dear Chairman Skelton:

The June 3, 1983, Subcommittee meeting held in West Covina was most appreciated. It allowed the presentation of information on local impacts of a statewide and nationwide hazardous waste management problem. The elimination and/or minimization of these impacts is the goal of the City. Any assistance by Congress and the administration in achieving these goals will be appreciated.

During the course of the testimony at the June 3rd hearing, a few points were made that require some clarification. They were:

1. Mr. Hinton from the California Department of Health Services stated that they were participating in a study in Southern California to find alternate landfill sites.

   The Department has been participating; however, the change in the State's administration and the resulting changes in staff have resulted in significant resistance by the Department to the completion of the study. Prior to the June 3rd hearing and as recently as June 9th, Department representatives have reportedly stated that they will not provide additional funds to complete the study. These funds are monies obtained from the Environmental Protection Agency for hazardous waste management in California.

   The Department representatives further stated that even if funding were provided, they would not continue their participation in the study. This certainly brings their commitment to question. It also is indicative of some of the frustrations that the City must contend with constantly.

2. Mr. Hinton stated that the Department inspects the landfill four times a year. To date, we have no record of these inspections. We have repeatedly asked to receive copies of any inspections conducted by other agencies. So far, the California Department of Health Services has not regularly provided these reports to the City.

3. While Los Angeles County's spill response system was such that the response unit operators had to run a "credit check" before responding, it must not be inferred that the City operated in that manner. We have always responded quickly with the payment of invoices guaranteed by the City. The City then worries about the reimbursement of these costs later.

4. Ken Kazarian of the BKK Corporation set forth the need for the elimination of fragmented regulations and enforcement by a number of State and regional agencies. The coordinated approach to the safe management of hazardous wastes has been the City's position since 1980 (refer to City's Hazardous Waste Management Position Paper). We are using every avenue available to us to achieve this end.

5. We certainly agree with the businessmen that greater support of local enforcement is needed to strictly call to the attention of hazardous waste transporters their responsibility to use mechanically safe and sound equipment to protect the public. The commitment of funds and manpower to this effort is certainly supported by the City.

6. Mr. Whisenhunt stated that the Eutek studies contracted by the City to study the odor problem and offer recommendations for improvement was based on data from BKK and was just massaged by Eutek. Examination of these reports by the Subcommittee staff will confirm that the data came from Eutek's field work, not BKK. Mr. Whisenhunt's statement may have intended to refer to the study conducted by the University of Southern California and not by Eutek.

I believe the above information clarifies some of the testimony received by the Subcommittee at the June 3rd hearing. If there are other questions or you desire further information concerning this matter, please contact me.

Yours truly,

Michael L. Miller
Environmental Services Director

MLM:ls

cc: The Honorable Esteban Torres
Member of Congress

City Council
City Manager

Dr. SIMPSON. OK. My second question is, do you have any information indicating what happened to property values, both commercial and residential, with the news and concern about BKK and its emissions?

Mr. MILLER. There are no specific studies. As part of the environmental impact report that was conducted through 1982, which has been sent to the subcommittee, that analysis on the potential for the impact has been addressed in that EIR. If, in fact, you need more information beyond that, we would be happy and try and find it, but there are no specific studies other than that environmental impact report.

Mr. LANDSBERG. I can give you something from personal experience. I lived two houses away from the border of the landfill and sold my home fortunately and was told by a number of realtors who went and examined the home and gave some estimates on its values, that if it would not have been located next to the dump, something in the amount of $30,000 to $50,000 difference in property value, depending on the location, and that was four to five realtors that mentioned that figure to me. That is not a statistical survey, but that is just a personal experience.

Dr. SIMPSON. Are there disclosure requirements concerning disclosing proximity to the landfill and what the landfill is and does?

Mr. MILLER. For new property owners buying homes—I think it was 1977 forward—adjacent to the landfill property, there was a thing called the prospective homeowners awareness package the city required the developer to give to each prospective buyer prior to signing anything on the dotted line that identified the site as either a landfill or as more information became available, and more specifics. That was required of all the tracts within the vicinity of BKK on the north side of Amar and on the north side of the landfill.

Mr. LANDSBERG. However, there are a number of homeowners involved in litigation, and one of the contentions is that we were not informed adequately because the prospective homeowners package states located north of these developments is a vacant, sanitary landfill site, and that was as late as 1980 when I purchased my home at that time.

Dr. SIMPSON. I have one final question: We heard earlier from people who either own or operate businesses that have been shut down and suffer from odors from the landfill. When the businesses shut down, is there some evacuation plan that is known to the owners and operators so that they can leave their places of business and safely get home?

Mr. MEACHAM. The city of West Covina in conjunction with a number of State and local agencies developed a hazardous disaster plan for the use of the agencies involved with regard to how we would respond to and deal with incidents. This information was publicized in the local newspapers and through other sources and we have had some inquiries relative to they would like to examine the plan or have a copy of it, but there has not been a widespread distribution of the plan because primarily it is an operating procedure for the governmental units on what their particular responsibilities are and what you do under any given circumstances.

Dr. SIMPSON. Thank you.

Mr. **Skelton**. Thank you very much, gentlemen.

Well, ladies and gentlemen, this completes our hearing. I want to say a personal word before we go. I appreciate the many folks who attended, the 22 witnesses who were kind enough to give us their thoughts and their opinions based on the facts. It has been very helpful to us as a committee.

A special thanks to our friend, Congressman Torres, not only for his interest and leadership on this subject, but for his persistence. I would not be here without him, nor would this subcommittee be here. The other members of the subcommittee who will have an opportunity to review this record are indebted to him also.

We are continuing to learn the facts on this issue. We have, as yet, as you obviously can tell, reached no conclusions. We are planning to hold another hearing on this subject, which will include other areas in the United States, later in the summer in our hearing room in Washington, D.C. Hopefully, from all of this we will be able to glean something of benefit not only to folks in West Covina, but to folks all across the country in this very serious matter. You are all very kind. I am going to have 3 minutes extra to make the airplane. I have to give an 8 o'clock speech tomorrow morning at the Lake of the Ozarks, so I do appreciate everyone for having been on time.

To close our meeting, I am going to turn the microphone over to Congressman Torres and again thank him for his leadership.

Congressman.

Mr. **Torres**. Thank you, Mr. Chairman.

I would like to especially acknowledge and thank the community, and the citizens of West Covina, who took time today to be here with us to discuss a very important subject that not only impacts on this community, but it has wide implications for the rest of the country.

I want to thank the local government and I want to say that I will continue to work with local government in trying to reach a resolution to this problem. I am happy that the task force is here because they are playing an important role in this problem, the homeowners association, the church people and, obviously, the business people who are an important factor in terms of not only the economic well-being, but jobs for the community; and to the safety people. Chief Meacham has been especially supportive in the utilization of security here at the hearing. As you know, we were able to secure a grant for the city to provide for a traffic inspection program. I have been fortunate to have the good assistance of your local assembly people: Sally Tanner, and Bruce Young, chairman of the State Assembly Transportation Committee. He has been instrumental in seeing to it that the California Highway Patrol becomes a participating agency.

Most of all, I really want to thank the chairman today for chairing these very significant hearings. We had another distinguished gentleman from the State of Missouri who led this country and he went by the title of "The buck stops here," none other than Harry Truman. Today, I think that the distinguished gentleman from Missouri, Ike Skelton, has demonstrated the buck does indeed stop here and I really want to acknowledge his leadership and the kind of conduct that he prevailed upon today.

Thank you, Mr. Chairman.

Mr. SKELTON. The hearing is hereby adjourned. Thank you.

[Whereupon, at 2:30 p.m., the subcommittee was adjourned, to reconvene, subject to call of the Chair.]

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